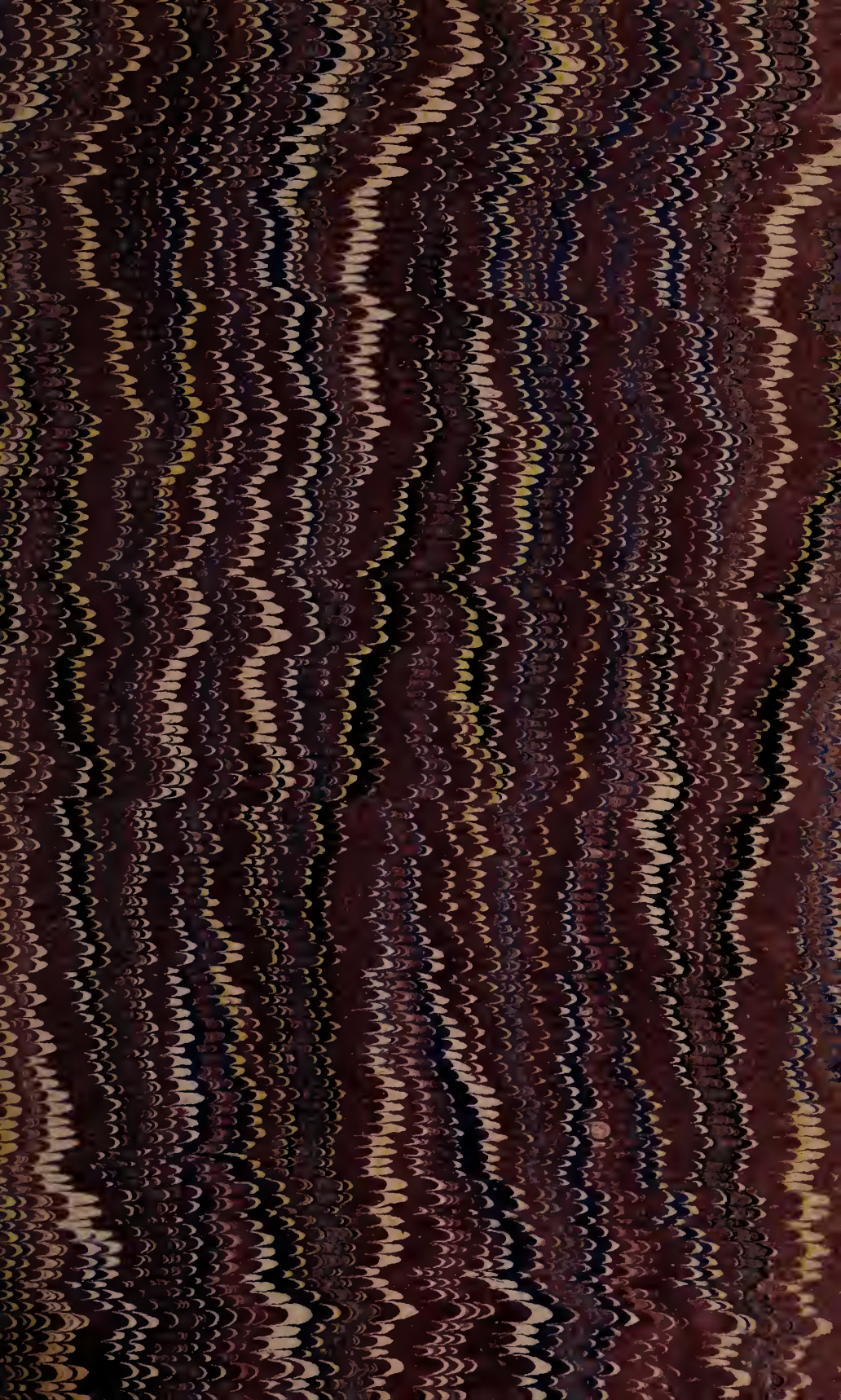


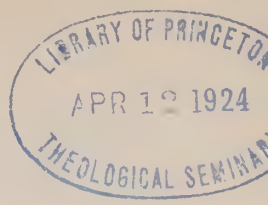
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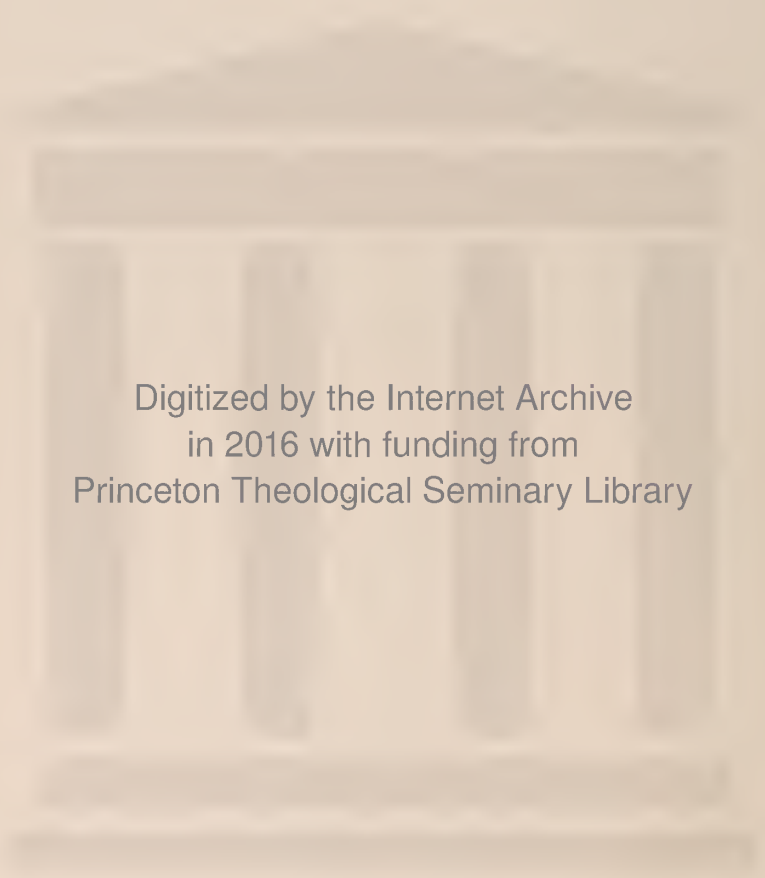
By Whom, all things; for Whom, all things.

FIFTY-SEVENTH YEAR.

JANUARY—JUNE. *See*

NEW YORK.

1881.



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PRACTICAL USES OF ELECTRICITY.

THE introduction of electricity into the business of life is probably to be the most noteworthy feature in the history of economic civilization during the last half of the nineteenth century. The latter part of the eighteenth was characterized, speaking broadly, by the invention of the steam-engine, the substitution of machinery for hand-work, and the development of the factory system of manufacture; the first half of our own century, by the introduction of the railway and the steamship, and the commercial phenomena which necessarily resulted from such improvements in the means of transportation: similarly, unless all signs fail, the present half-century will hereafter be memorable as the period when man subdued to his service the mysterious power of electricity. It is true that before 1850 science had discovered nearly all the facts and principles upon which the present industrial applications of electricity depend. The galvanic battery, the magneto-electric machine, the telegraph, and the electroplating bath already existed, and the two latter were beginning to be used commercially. But at that time the world would hardly have felt the difference if by some strange accident it had suddenly lost the use and knowledge of them all. Thirty years have changed all that. Imagine that this morning every telegraph-wire had disappeared, every galvanic battery had lost its virtue, every dynamo-machine was stopped—that all communication and operation by means of electricity had come to an end; how profoundly the whole community would be affected before nightfall! When a storm, a few months ago, prostrated many of the telegraph-lines around New York City, business came almost to a standstill for the time. And while electricity is already so important a factor in our

business life, it is impossible to doubt that by 1900 it will hold a far more dominant position. Every year, almost every day, brings to light some new application of this agent, and its use develops with continually increasing rapidity.

We propose in the present article to discuss the subject in a general and, so far as may be, untechnical manner, for the purpose of giving our readers an idea of the extent and variety of the existing applications of electricity to the arts of life, and the reasons for expecting their rapid multiplication in the near future. We do not aim at scientific completeness, and we shall not scruple to treat with disproportionate brevity those matters with which intelligent people are already familiar, in order to gain space for other topics at present less generally understood.

And first, by way of introduction, a few words as to the nature of electricity—a confession of ignorance. All that science can do at present is to define it as the unknown cause of certain effects which are observed when a piece of amber (*electron*) is rubbed—an observation dating back two thousand years. It is now known, of course, that not only those phenomena, but a whole multitude of others, depend upon the same cause. As to the real nature of the cause we have no certain light as yet: we cannot tell whether electricity is some peculiar kind of substance, or some modification or motion of ordinary matter. In the case of heat, which for a long time was thought to be a substance and called caloric, experiment has settled the question, and proved it to be merely a mode of motion. In reference to electricity no such decision has yet been reached. No phenomena have thus far been discovered which absolutely negative the notion that it may be a subtle, imponderable fluid or fluids, endowed with certain peculiar faculties of attraction and repulsion, and more or less freely circulating among the particles of bodies. According to this view an electrical charge consists in the collection of some abnormal quantity of this substance in the charged body; an electrical discharge is, then, the actual transference of a quantity of the fluid from one body to another, and an electric current is such a transfer continuously progressing.

Another view, however, seems to carry, at present, a greater weight of opinion in its favor—that, namely, of Maxwell. Ac-

cepting the idea of a medium filling all space (the luminiferous ether of optics), he regards an electric charge as the establishment of a peculiar state of strain among the atoms of the charged bodies, and in the medium between them. A discharge consists in the sudden relief of this strain by a giving way of the intervening medium, without necessarily implying any transfer of substance through it; and an electric current is a rapid succession of such discharges. In its application the theory is mathematically difficult, but it explains many facts which the fluid theories fail to touch, and opens the way for the establishment of relations between electricity and the other physical agents, especially light and heat. It is to be expected that the progress of science and mathematics will in due time furnish some *experimentum crucis* which will discriminate between the two hypotheses, or not impossibly upset them both. There is certainly great probability that some hypothesis will yet be found which will include in one general theory all the physical agents—light, heat, gravity, and chemical affinity, as well as electricity and magnetism. But the hour and the man have not yet come.

We have confessed ignorance as to the absolute nature of electricity; but the reader must not suppose, therefore, that there is any corresponding obscurity and uncertainty as to the phenomena it produces, and the laws which govern them. We may not know what electricity is, but we can measure it in “farads” and “webers” as accurately as water can be measured in “quarts” and “inches.” We can express electrical pressure in “volts” as precisely as water-pressure in feet of “head;” and we can describe the resistance of an electrical conductor in “ohms” as definitely as the frictional resistance of a pipe of given size and length upon a stream of water flowing through it can be expressed. It is no more necessary to know the nature of electricity in order to deal with and utilize it, than it is to know the nature of water in order to make it drive our mills; altho, of course, the more we learn about either the better we can manage it.

Unquestionably the most important of the practical uses of electricity hitherto developed is the communication of intelligence between distant points; not only in the telegraph proper,

and the telephone, but in all the various signalling arrangements where electricity is made to serve as the nervous system of a complicated organization, co-ordinating the action of the different portions and bringing them under central control.

The history and operation of the telegraph is so familiar to all intelligent persons that we need not spend much time in its discussion. Tho not yet forty years old, it has already become such an essential part of our civilization that its loss, as has been said, would instantly paralyze the life of the world. All the great operations of business depend upon its use. Our railways are run by its aid, and without the wire the carrying capacity of any important road would practically be reduced at least one half, because trains could no longer be moved at small intervals without constant danger of collision.

There may be a question whether there is really any advantage to mankind in the rapidity with which "news" now makes its way in the world; but there can be none that the fact is a most important, even a controlling, element in determining the differences between the characters of the men of the eighteenth and nineteenth centuries. The only reasonable expectation that our people, spread over so vast and various a country, will remain permanently one nation, hangs upon the hope that our modern means of communication will so intermingle us and our ideas that we shall measurably be freed from provincialism and sectional dissensions by becoming personally acquainted with each other, and having presented to us from day to day the same material for thought and feeling. Thus boundary-lines virtually contract and a continent becomes a county.

The magnitude and extent of the telegraphic system in the United States alone is something amazing; New York City itself has about 6000 miles of telegraph-wire, and there are nearly 300,000 miles in the whole country—enough to reach from the earth to the moon and a long distance beyond, since our satellite is only 240,000 miles away. Many of these, too, count for two or four apiece, being worked "duplex" or "quadruplex;" *i.e.*, in the language of the electrician, they have associated with each of them several "phantom" wires, which, having no actual existence, yet answer all the telegraphic conditions of metallic conductors. We know of nothing more ingenious or

surprising than the methods (for they are various) by which a single wire is thus made to serve the purpose of many, in transmitting, without confusion or interference, several messages at once, some in one direction and others in the opposite.

We have not before us the exact statistics of the subject, but the whole length of telegraph-wire on the earth's surface and beneath its oceans cannot be far from a million and a quarter of miles. Five years ago it was reported at 978,000, and since then the erection of new lines has been going on faster than ever before.

And not only has the length of the lines been growing, but their efficiency also. We have spoken of the contrivances by which one wire is made to answer the purpose of three or four, but besides this the instruments and methods of telegraphy have been improving, so that a quadruplex wire of to-day, worked with some of the "rapid telegraph" apparatus, is capable of doing at least ten times as much business as one wire could have carried ten years ago.

How far the telegraphic system of the world will be extended in the future it is impossible to predict. Wherever civilization goes the wire will go, of course; and, so far as can be judged, in lands which now have the telegraph the lines will be greatly multiplied, tho the competition of the telephone will necessarily be felt. It is quite within the range of possibility that, so far as epistolary correspondence is concerned, the mail-bag may some time be entirely superseded by the wire. Perhaps it is hardly likely, however, since the newspaper and other printed matter will always demand a postal system, and so long as that exists letters will probably continue to be written and sent.

We have alluded to the competition of the telephone. It is very difficult, however, to draw the line between the telegraph and telephone, and in England the government, which has bought out the private companies and works the telegraph-lines as a part of its postal system, refuses to recognize the distinction. If there is a distinction to be maintained at all, it would probably lie in this: In telegraphing, the sender and receiver of the message employ a third person, and perhaps several persons, to transmit the message between them; the process is analogous

to that of sending a package or letter by a conveyance. In telephoning proper, on the contrary, the sender and receiver converse directly, without the intervention of any one. The apparatus is virtually only a speaking-trumpet, and the operation is analogous to shouting across an interval of space. Of course in this view of the matter the peculiarity of the instrument itself drops out of sight. Should the telephone be so far improved that it will work easily over distances of hundreds of miles—as it probably will¹—then it is likely to displace most of the present telegraph-instruments at the minor stations, simply because it can be operated by any person, without requiring the peculiar skill now necessary to send and read a telegraphic message. In railway telegraphy especially its satisfactory introduction would be a great gain. For through business, however, it is probable that some form of rapid-telegraph instrument, more or less analogous to those now in use, will be retained, because such instruments can be operated with multiplex wires, and are capable of transmitting in an hour many times the number of words which could be uttered by the most rapid speaker.

It is not easy to form an idea how much the direct use of the telephone is likely to extend. In our cities and large towns it must, of course, find its principal use, and it is very probable that the time will come when, as a matter of municipal organization, every house in every considerable city will have its telephonic connection with some central station. The number of purely private lines for purposes of business and friendship is sure also to be very great: it is already large, and would by this time have become vastly larger but for the heavy royalty. Five or ten dollars a year is more than most people are willing to pay for the mere use of an instrument which can be constructed for one or two dollars.

It is perhaps not impossible that some forms of the telephone may be used for other purposes than the mere transmission of con-

¹ Since this was written it has been announced that Herz, in Germany, has made an improvement in the telephone by means of which, without using batteries of any inordinate strength, he has been able to converse satisfactorily over circuits exceeding three hundred miles in length, and that, too, when part of the circuit was a submarine cable. We have not yet seen any authentic description of his invention.

versation. Mr. Edison's "loud speaking" telephone is certainly a most extraordinary instrument: we shall never forget the sensation of hearing it for the first time. Several of us were listening intently, with telephones of the usual pattern, to the voice of the person who at the other end of the line was reading something to us from a newspaper. We could hear him well enough when everything was perfectly quiet, but it required close attention. Suddenly the little chalk cylinder of the new machine was put in motion, and at once the whole room was filled with the voice of the reader, as distinct as if he were in our midst, and much louder and more resonant; the tones were perfectly clear, but a little strange, just enough so to heighten the sensation. With an instrument of this kind a speaker of feeble voice could address an audience of any size, and at a distance of many miles, far more effectively than if he were before them, at least so far as the mere utterance of his ideas is concerned; and he could speak not only to one audience, but to several at the same time if the occasion demanded.

The use of electricity for the communication of various kinds of signals which can hardly be considered as telegraphic is very important and extensive. Take for instance our burglar-alarms, and the electric annunciators which in our hotels and steamboats have superseded the old system of bell-wires. In many kinds of textile machinery also, where it is important that the breaking of a thread or any derangement of the machine should at once arrest the movement, electricity is found to furnish the most prompt and reliable means for effecting the purpose. Fontaine mentions an instance where the application of such a device has reduced the necessary number of operatives from one for each knitting-frame to one for ten; four operatives aided by electricity taking the place of the forty previously needed.

In general, it may be said that wherever the nature of an organization or machine is such that something analogous to a nervous system is required to make it efficient, electricity supplies the want better than anything else, at least if the distances to be covered are at all considerable. The organist sits at his keyboard, and by the help of electricity manipulates pipes placed at any distance and in any position determined by the architect. The astronomer, without moving his eye from the

instrument, communicates his observation to the chronograph by a tap of the finger, and secures a permanent record of the moment.

The clock of the observatory at Washington sends out its beats each noon over many thousand lines of telegraph-wire, and drops the ball which furnishes our principal seaport with its standard time. Several other observatories in this country do the same thing to a more or less limited extent, and in Great Britain the system is far more complete and thoroughly organized than here. The Greenwich signals go to almost every important city in the kingdom, and all the railroads are run by Greenwich time. In other parts of Europe, in Germany and France especially, the system is almost equally prevalent, and is gaining ground continually. In many cases it is not considered enough to send such time-signals once or twice a day merely. The beats of the standard clock of the Cambridge observatory are transmitted continuously to some twenty different stations in Boston, and there is a similar time-service in New York, which furnishes to the subscribers the beats of a standard clock. Many systems of electric clocks are also established in our railroad-stations and elsewhere, the clock-face being controlled by the action of a distant timepiece, moving its hands either continuously or at stated intervals. In Paris a similar system has been introduced on an extensive scale within the last few months, at the expense of the municipal authorities. The standard clock of the national observatory is connected by special lines with about thirty "horary centres." At these points are placed clocks the pendulums of which are continuously controlled by impulses sent every second from the observatory, and they in their turn distribute their beats to numerous stations in the vicinity. The whole city is thus supplied with time uniform and correct to the second.

It would take us too far from our immediate purpose to discuss here the feasibility and advantages of a uniform time over the whole extent of our country—uniform, that is, as to its *minutes* and *seconds*, the hours being varied where necessary, so that the standard railroad and business time should nowhere differ more than half an hour from the true local time. There are some obvious objections, of course, but there is little doubt

that they will ultimately be overruled in view of the importance of an authoritative standard, a necessity which will be felt more and more imperatively as the means of communication multiply and grow more swift. It is not unlikely that the system may even reach beyond the limits of a nation, so that all the English-speaking world at least will come to live by Greenwich time—by telegraph, of course, if at all.

It would be impossible, and it is not necessary, to enumerate all the different forms of signalling apparatus—fire-alarms, watchman-inspectors, and such—which depend upon the use of electricity for their efficiency. It is enough to say that contrivances of this kind are multitudinous, and many of them are of great importance and in extensive use already.

And as to future inventions we may lay down the fundamental principle that by means of electricity it is always possible for a person to effect at any distance any mechanical operation which he could perform if he were on the spot. It is a mere question of expense: the number of telegraph-wires needed may be so great, and the cost of the apparatus so high, that the operation would not pay; but so far as possibilities are concerned the human arm is now virtually as long as the electric wire. I can sit in my study and steer a torpedo-boat in New York harbor, or ring the bells of Boston, or play the organ in St. Peter's, or explode a mine in China, or write a letter on the desk of my correspondent in Constantinople. Just such things are done now every day, and will be done more frequently and easily hereafter.

We ought not to pass, with a bare allusion, the use of electricity in the management of explosives, for it has greatly increased their efficacy in military and mining operations. We all remember, of course, how, a few years ago, the touch of a little child's finger blew up the reef in Hell Gate. Any other known method of firing the mine would have deprived it of much of its power, because it would have been impossible to secure the simultaneity upon which the efficiency of the blast depended. At present nearly all the powerful explosives now in vogue are used only in connection with electric fuses of some kind or other. For safety, convenience, and certainty of action they are as immensely superior to their predecessors as are the new explosives themselves.

Electricity finds another extremely important practical application in a widely different range of uses—by means of its effect upon chemical reactions. As typical may be mentioned the electroplating industry, the electrotype, and the use of electricity in certain metallurgical and chemical operations.

We are not sufficiently familiar with the subject to be able to give statistics in respect to these matters, or even to enumerate all the different applications of electricity in this branch of technology. Every one knows, however, that the business of electroplating alone is something enormous. The great firms of Elkington, in England; Christofle & Co., in France; and the Meriden and Providence companies, in this country, not to mention others nearly if not quite as important, employ operatives by the hundred and deposit silver and gold literally by the ton. In the magic bath the precious metal is torn off, atom by atom, from the shapeless lump, and transferred to the surface it is to clothe and beautify as if by invisible gnomes, working with inimitable speed, deftness, and docility.

The same agent is employed, and the same principles are involved, in the processes by which wood-cuts and engravings are copied and the pages prepared for printing. The plate or block upon which the artist has expended his skill is not subjected to the wear and tear of the press, but fac-similes are made in any necessary number by means of the electrotype. These endure the rough service, while the original is kept in reserve ready to be recopied whenever wanted.

One curious application of the process is in the manufacture of the so-called compound telegraph-wire, which consists of a central wire of steel covered with a coating of copper. This coating is deposited upon the steel by galvanic action, while the wire is drawn continuously through a long trough containing the necessary solution.

Electricity is used also in certain processes for the reduction of copper and other metals from their ores, and in the manufacture of certain chemicals extensively employed in the arts.

A few years ago the only generator of the electric current in ordinary use was the galvanic battery in some form or other. For all telegraphic purposes it answered very well, and fairly for the processes of electro-chemistry. But it was always a costly

and troublesome affair when currents of any great strength were needed, and is now practically superseded in all such cases by mechanical generators, which depend for their efficiency upon the rapid motion of coils of wire in a magnetic field. The machines of twenty years ago were cumbrous and inefficient; but in 1866 Wilde, in England, constructed one involving several new principles and possessing a power before undreamed of: it is the type and original of many of the best machines now in use, altho it has, in the development, received from Varley, Wheatstone, Siemens, and others numerous alterations and improvements which have greatly increased its efficiency. In 1871 Gramme, in France, introduced another machine of peculiar construction, which was at once recognized as superior to anything then known; and it still keeps its place, hardly surpassed by any even among the newest.

The machines best known in this country at present are those of Gramme, Siemens, Brush, Weston, Maxim, and Edison, tho they have many rivals, some of them perhaps their equals. Any of those named, when driven under the conditions for which they were designed, are most effective converters of horse-power into electricity, the best of them having been shown by careful experiment to realize an efficiency of nearly 90 per cent; that is to say, if the electric current produced by the machine is made to heat a coil of wire immersed in water, it is found that the quantity of heat developed is 90 per cent of that which would be theoretically equivalent to the energy expended in driving the machine.

A word as to the expression "efficiency," so variously used as to have led to much ambiguity. As we have just employed it, the term denotes simply the ratio between the power expended in turning the machine and the useful effect produced. In this sense of the term that machine is most "efficient" which gives the greatest amount of electric work in return for each horse-power of propulsion, without regard to the magnitude or expense of the machine itself. Sometimes, however, the matter is discussed with reference to the cost of the machine required to produce a given current, and in that case, tho only loosely speaking, the most "efficient" machine is the one which is capable of giving the most powerful current for the money ex-

pended in building the apparatus, without regard to the expense of driving it. Again, since the strength of the current produced depends upon the arrangement and size of the wires through which it circulates, it has been inquired what arrangement of the circuit would enable us to get the greatest amount of electric work from a given machine; or, *vice versa*, what machine will produce in a given circuit the maximum effect: and in this sense the most "efficient" machine is the one which will do the most work under the circumstances of the case, and that is the most "efficient" circuit which will realize the most work from a given machine; the expenditure of driving energy being lost sight of in this case also, as in the preceding.

Of course the most efficient machine in a commercial sense is the one which will give the greatest effect at the least *cost*; the cost being made up of two items—one, the expense of the driving power; the other, the interest on capital and the allowance for wear and replacement. In these days of low interest it will evidently pay to aim at durability and economy of power, even at a considerable first cost. Generally speaking, it may also be said that it is much cheaper to generate electricity in large quantities than in small. A machine which consumes directly the whole energy of a hundred horse-power steam-engine will produce its current for considerably less than it would cost to run twenty machines each using five horse-power, provided always that profitable employment can be found for such a tremendous current; for it is possible to conceive of a Great-Eastern among dynamo-machines, one too large to pay.

The ability to produce by means of such machines currents of any desired power, and at a reasonable expense, has opened for electricity an enormous range of uses which were out of the question in the days of galvanic batteries. It is quite within bounds to say that to produce the current which operates one of the electric-light circuits on Broadway by means of a battery would cost from ten to twenty times as much as it does to generate it in the present manner by means of a steam-engine; and not only would it cost more, but it would be quite impracticable, except by most extreme precautions, to keep the current running without interruption as much as twenty-four hours at a time.

It need hardly be said here, for every one's thoughts are more or less full of the matter at present, that already one of the most important applications of electricity is to the production of light. So far as regards the illumination of large spaces by lights of high intensity the problem may be considered as solved by a number of inventors whose different systems are already in successful operation. As to the lighting of houses and limited areas more perhaps remains to be done; but even as things stand to-day it is beyond question that the thing is entirely feasible, and at a cost considerably lower than that of gas.

The lights employed are of two kinds—the “arc” lights so called, which are produced by a current of electricity playing between two slightly separated pencils of carbon, and the “incandescent” lights, which are produced by a current passing through a continuous filament or slender rod of some refractory substance, which is also usually carbon. There are other possible forms of the electric light, but none of them appear likely to find much use in competition with the two we have named, tho in some cases the light produced by passing a rapid succession of discharges from an induction-coil through a tube filled with gas at a low pressure is utilized for scientific purposes.

The “arc” light dates back to the experiments of Davy in 1813, who first produced it by touching together two pieces of charcoal attached to the poles of his historic battery. On one occasion he employed a battery of two thousand pairs of plates (probably equivalent to about a thousand of those now used), and produced an arc nearly five inches in length; *i.e.*, the current continued to pass even after the charcoal pencils were separated by that space. It is very seldom even now that such effects are exceeded. The experiment remained, however, a rare and costly one for thirty years. About 1844 Foucault, in Paris, hit upon the happy idea of substituting for the pencils of willow charcoal, used up to that time, rods of the dense hard carbon cut from the deposits which line the insides of old gas-retorts. These new carbons last much longer, and are more manageable. This improvement, the introduction of the powerful batteries of Grove and Bunsen, and the invention of effective lamps or regulators soon made the use of the electric arc much more common than before, tho still sufficiently rare.

In 1858 an electric lamp was established at the South Foreland light-house, on the English Channel, driven, not by a battery, but by a machine constructed by Holmes; a machine presenting no new features of importance, but simply a magnification of the smaller machines then found in every cabinet of physical apparatus. In 1863 a similar light, driven by a machine of slightly different construction, was established on the French side at La Hève. These lights have been running ever since, and several others have been added at different points upon the coasts of France and England. The machine invented by Wilde in 1866 (already spoken of) quite changed the aspect of affairs, and since then progress has been rapid and continuous.

At present the carbon rods employed are usually manufactured for the purpose by some one of many different processes of alternate compression and baking. They are rather expensive, so that their cost, according to the estimates of Fontaine and others, generally exceeds by a considerable amount that of the fuel burned in the engine which drives the current-generator. They are usually burned in "lamps" so constructed as to regulate for themselves the distance between the points; in some of them a new pair of carbons is automatically substituted for one that has been consumed, and in nearly all an arrangement is provided by which, in case of the failure of the lamp for any reason, the circuit will be closed so as not to affect other lamps which may be connected with the delinquent.

The number of these different electric lamps is already very great, and is continually increasing. Every bulletin of the patent-offices is sure to contain several inventions of this kind, some of them comically worthless, but many of them exceedingly ingenious and well thought out. Between the better lamps there is not much to choose, the steadiness and general good behavior of the light depending mainly on the excellence of the carbons and the uniform action of the generator.

At present "arc" lights are run both by continuous and by alternating currents; *i.e.*, in some cases the current is steadily in the same direction, while in others the current consists of pulses alternately positive and negative, succeeding each other at the rate of from 10 to 100 per second.

In a lamp actuated by a continuous current the positive car-

bon, for reasons as yet undiscovered, becomes much hotter than the negative, and is consumed about twice as rapidly. This requires a special mechanism for keeping the light at the same point, and demands attention to make certain that the wires are properly connected to the two terminals of the lamp. Where alternate currents are used this difficulty is, of course, obviated; the lamp becomes simpler, and it is entirely indifferent in what order its terminals are connected with the circuit. Nor is the generator any more difficult to construct, tho probably it is slightly less economical of power.

There is, however, one literally fatal objection to the use of alternating currents which ought to prohibit their use. The wires from a continuous-current machine can be handled without danger to life; the shock obtained, tho disagreeable enough, is not fatal: with the alternating current it is different; the shattering power of the intermittent shocks is tremendous, and several persons have already been killed by accidents from them. Probably all recollect the recent case upon the *Livadia*.

The amount of light which can be produced by an "arc" lamp is enormous, depending, of course, upon the size and excellency of the carbons and the power of the current; and the larger the light the more economical it is; *i.e.*, a great light costs less for each candle-power than a small one. With the small lamps it is usual to get from 500 to 1200 candles¹ for each horse-power consumed by the engine; large burners do better, running as high as 2000 or 2500. Probably the most powerful lamp ever yet constructed is one recently made and tested in Cleveland by the Brush Electric Light Company under a special order from the British Admiralty. It is estimated at 100,000 candle-power, using carbons two inches and a half in diameter, and consuming forty horse-power. The ordinary arc-lights, of which there are now so many in our different cities, consume from one and a half to two horse-power, and give lights varying from 800 to 2500 candles.

For a long time it was found very difficult to run more than

¹ The unit of illumination ordinarily used in this country for photometric purposes is the light given by a sperm-candle of such size that six weigh a pound, and burning 120 grains an hour. An ordinary gas-burner is from twelve to fifteen times as bright.

one or two lamps in a single circuit, and machines were constructed which supplied each lamp with its own separate current through its own conductors. Of course this added greatly to the expense, especially in the matter of conductors. The difficulty has, however, been overcome in great measure, and at present Mr. Brush with some of his more powerful machines drives as many as forty lamps in one circuit, the remoter ones being as far as five miles from the engine, and that without any inordinate expense for the conducting cable.

As to the economy of the system, there can be no question that even in rather unfavorable situations, as, for instance, in the lighting of streets where the lamps are pretty widely separated, the electric light is at least as cheap as gas at one dollar a thousand feet. Under the most favorable circumstances, as in the lighting of mills and factories, where no separate plant is required to furnish the driving power, the saving is very great.

The total number of such lamps already in use is enormous. The Brush Company alone reported last January more than 6000 in operation—1200 of them in foreign countries. In this country 4860 were distributed, as follows:

	800 lamps in metal-working establishments.
1240	“ cotton and woollen mills.
425	“ stores, hotels, churches, etc.
250	“ parks, gardens, docks, etc.
277	“ railway-stations.
1500	“ streets of cities.
380	“ unclassified.

Probably the lamps of Siemens and the so-called candles of Jablochhoff are still more numerous in Europe, while those of other systems are not greatly behind.

Lights of this kind, however, are not suited for all purposes, as, for instance, for household illumination. What is wanted here is a lamp which will furnish somewhat more light than an ordinary gas-burner and will require no skilled attention to maintain it. To compete with gas it must be at least as cheap, and must not subject the user to any greater inconveniences.

What are called incandescent lamps best answer these conditions. When a current is passed through a conductor it heats it

more or less, and if the conductor is of such a nature as to oppose considerable resistance, its temperature may rise far above the incandescent point, so that it will become luminous and shine, *without consuming*, as long as the current passes. At first it was attempted to use metal filaments, but it was soon found that the temperature required to make them give off much light is perilously near that of fusion, even with the most refractory. Slender rods of carbon were then tried, and so far as principles are concerned the lamp invented by Starr and King in 1845 embodies pretty much everything of value in the newest. They employed carbon and enclosed it in the most perfect vacuum then known to science, in order to prevent the wasting action of the air. But at that time rods of carbon could not be made sufficiently slender and compact, nor were the present means of producing a perfect vacuum available, and, above all, the dynamo-electric machine existed then only in embryo. It would take us beyond our reasonable limits to trace the history of lamps of this class (tho that of Lodyguine, invented in 1873, must not be passed quite unmentioned), but we have at present one which seems likely to meet all the requirements of the problem. We say *one*, because the finished thing is essentially the same as made by either of the three different inventors who claim it—Swan in England, and Edison and Maxim in this country. There are, however, more or less important practical differences in the methods by which the carbon filament, which is the essential feature and light-producing agent in all of their lamps, is prepared and connected to the conductors, as well as in the operations by which the glass vessel enclosing the filament is exhausted and sealed.

Of course this is not the place to discuss the questions of priority and patent rights involved in their respective claims.

These lamps use up nothing, in shining, except the current which excites them; they possess no complicated mechanism to be kept in order; they are small—not larger than an ordinary lamp-chimney; and they cost very little to construct in a large way, certainly not half a dollar apiece. On the other hand, they do not rival the arc-lights in brilliance (at least as a general thing, for Maxim has constructed a few of several hundred candle-power), and their luminous duty, if we may coin the

expression, is as yet only between one and two hundred candles per horse-power, or about one sixth that of the arc-lights. The arc-light is not, however, anything like six times as cheap as the other per candle-power, because its consumption of carbon pencils, as has already been said, costs more than the engine-power itself, while the incandescent light escapes this charge. Still the incandescent lamp cannot be regarded as absolutely imperishable, and as a matter of fact is seldom so perfect in all particulars as to last in practice more than two or three months; but the cost of replacement is trifling.

Besides these forms of the incandescent lamp there are others which, like that of Sawyer, more resemble the original lamp of the Starr-King patent. Instead of a slender carbon filament with an electric resistance of from fifty to two hundred ohms, they employ a small pencil of carbon some half an inch long, and about one twentieth of an inch in diameter, enclosed in a case which can be taken to pieces to replace the pencil when consumed. The resistance of these lamps is generally only from five to ten ohms, so that they are used, several of them consecutively in the same circuit, like arc-lamps. The lamps of the Edison type, on the other hand, have resistances ranging from fifty to two hundred ohms, and are inserted into the circuit side by side (technically "in multiple arc"): the portion of the current which flows through one lamp passes through no other.

There are also lamps, like that of Werdermann, which are intermediate between the purely incandescent and the arc. The thin pencil of carbon from which the light emanates touches lightly a larger block of carbon, and produces at the point of contact a brilliant star of light, without, however, forming an actual arc. But the carbon pencil wastes away pretty rapidly, and on the whole the apparatus is probably inferior to either of the two between which it is a cross.

We shall not undertake to discuss at length the economical question as to the lighting of houses by electricity. As against gas, advantages and disadvantages are both obvious: on the one side, a whiter light, freedom from heat and vitiation of the air, from foul smells and tarnish; on the other, the inability to store the supply against the time of need, the rather greater

liability to interruption by accident, and the difficulty of graduating the brightness of a given lamp in an economical manner. One can turn down a gas-flame and burn it low. No effective arrangement is yet known for doing the same thing with an electric lamp, at least in a satisfactory and easy manner.

As to comparative expense it is yet too early to decide with much confidence. The necessary conductors and current-meters on the electric system will probably about offset the service of gas-pipes and gas-meters, but they may turn out more costly than has been anticipated. The actual expense of producing the light, apart from all questions of interest on plant, will certainly be in favor of electricity.

But here another consideration comes up of great importance. The electric plant once being established and electricity "laid on" in the streets of a city as gas is now, it may be used very profitably for other purposes than that of lighting, especially for the transmission of power. The electric plant may thus be made to earn revenue by day as well as by night. Unless we are much mistaken, electricity will be more used in the near future as a means of transmitting power than for any other purpose.

Many attempts were made in the early days of electro-magnetism to construct electro-magnetic engines; *i.e.*, to drive machinery by means of a galvanic current. There was no difficulty in making the machines go, but there was difficulty in making them pay. The simple fact is this: at current prices of mining, manufacture, and materials, every horse-power of energy developed in the current of a galvanic battery costs more than twenty times as much as a horse-power generated by a good steam-engine, and no ingenious contrivances for using the current can evade the fundamental difficulty. To put it differently: the mere coal consumed in extracting a ton of zinc from its ore would produce as much power in the boiler of a steam-engine as could be got from the use of the zinc itself in a galvanic battery.

If, however, a method is ever found by which electricity can be developed directly, economically, and manageably by the consumption of fuel, without the intervention of steam or other engines, the case will be altered. To a certain extent the

thermo-electric battery now does this very thing, but very imperfectly and wastefully.

For the present, then, we cannot profitably use battery currents to produce power; but we may use currents developed by a mechanical generator of electricity as a means of transferring power from one point to another; and apparently this is a far more economical method than any known system of mechanical transmission by wire ropes, water-pipes, or compressed air. All that is needed is a suitable conductor from the electric generator to the electric motor which is in construction identical with the generator itself, either being capable of driving the other. The conductor once laid remains without wear and tear, costing nothing but the interest. It would take us too far to discuss the conditions for the most profitable use of electricity in this way. We may say in general that currents of small quantity but high electro-motive force (like water streams of small velocity and high pressure in hydraulic pipes) are theoretically most economical; but then such currents are harder to manage on account of difficulties of insulation, so that a compromise must be effected. In practice it is found that many of the machines in use will transmit from one to ten horse-power a distance of a mile with a loss of less than twenty per cent.

One of the earliest applications of this principle was in some experiments by MM. Chrétien and Félix in France in 1878. They ploughed fields by electricity, substituting for the engine which had been used to pull the gang of ploughs a Gramme machine. They also used the same sort of machine upon a crane employed for the unloading of boats in the harbor of Sermaize, at an estimated economy over steam of nearly thirty per cent, after several months of trial.

In the electric railways of Siemens and of Edison the rails are used as the conductors, and the locomotive is replaced by a car on which is an electric motor deriving its current from the rails. By this arrangement it is possible to concentrate the motive power at central stations, and to substitute for the wasteful locomotives engines of a much more economical type. It is probable that for city tramways, elevated railroads, and other roads of similar description, the system will come into extensive use.

We have seen recent accounts of various machines driven by

electricity. One is a pile-driver, in which the steam-engine is replaced by an electric motor. Another is an electric elevator, in which an electric motor carried in the car is driven by a cable brought to it from the basement, and by means of an endless screw works the gearing which carries the car up or down. This contrivance is absolutely safe; in case of the failure of the current for any reason the car does not fall, but simply stops, and can be worked up or down by hand from the inside so as to release its inmates. Another ingenious machine is an electric hammer by Siemens, designed to replace the steam-hammer for not too heavy work. All of these appear to be entirely successful.

Indeed, as Professor Ayrton has pointed out, it seems very possible, perhaps even probable, that our whole industrial system is to be profoundly modified by this new possibility of economically transmitting the energy generated in large quantities and under the most favorable conditions, and so distributing it that it can be utilized a little at a time wherever needed. Instead of bringing operatives to their work and herding them in mills and factories, it may be possible to send the work to their homes, and thus to avoid many of the most serious evils of our present methods.

Our limits forbid more than a mere mention of certain other uses of the electric current. Siemens has experimented upon the effect of powerful electric lights upon the growth of plants, and has clearly shown the possibility of forcing vegetation and fruitage in this manner to an almost unlimited extent. The same gentleman and Jamin, in France, have shown how to employ the electric arc in blowpipe and crucible so as to produce for industrial purposes intensities of temperature never before attained; and others have proposed to use the current as a means of ordinary heating and cooking in the household. As to this latter proposition it is enough, however, to say that the method cannot be economical, tho it may be convenient in some cases. The steam-engine which produces the current never utilizes quite twenty per cent of the heat produced by the combustion of its fuel, to say nothing of the subsequent loss in transmission.

Of the uses of electricity in medicine and surgery we add

nothing here, nor of its applications in strictly scientific research, these subjects lying one side of our purpose.

We must not close without an allusion to the International Exhibition of Electricity which is to be opened at Paris next autumn under government auspices. It is sure to be one of the most interesting and important exhibitions ever held. One will be able to see in action nearly every form of electric generator, all sorts of electric lights and motors, all kinds of telegraphic and telephonic apparatus, all the different appliances by which electricity is used in chemical and metallurgic operations, and the instruments for measuring and determining all kinds of electrical constants.

It will gather together the most magical and incredible of facts, some things completed, the beginnings of more, the seeds and embryos of almost a new civilization.

CHARLES A. YOUNG.

CHRISTIAN METEMPSYCHOSIS.

“IF a man die, shall he live again?” The Christian Scriptures assure us that he will, and that his future life will be, in some manner, a state of retribution for the life that now is. More distinctly still we have, from the Master’s own lips, the solemn announcement of a fixed period of Final Judgment. “For the hour is coming in the which all that are in the grave shall hear his voice, and shall come forth; they that have done good, unto the resurrection of life; and they that have done evil, unto the resurrection of judgment.”¹ Beyond these general assurances, however, no definite information is given respecting the period, nature, or circumstances of our future stage of existence. Enough is said to furnish a mighty sanction for the practical teachings of the Gospel, and thus to supply a strong motive for the purification of our life and character while here; but nothing is vouchsafed to gratify an idle curiosity. Hence a wide field is left for conjecture and speculation, which, if properly conducted in a reverent spirit, and with due reserves, may serve to enlighten and confirm our faith without disturbing its foundations, or pretending to be wise beyond what is written. Along the outer lines of what is explicitly revealed, and without trespassing at all upon the inclosed region of positive belief, there is abundant room for the legitimate and profitable exercise of a devout imagination.

This was certainly the opinion of an eloquent writer and earnest advocate of the strictest orthodoxy of Christian belief, the Count Joseph de Maistre. From his “Evenings at St. Petersburg” (vol. ii. p. 191) I translate the following passage: “Under this head [of legitimate conjecture] I class all those opinions not directly supported by revelation, but useful for

¹ I have translated literally *εἰς ἀνάστασιν κρίσεως*, instead of adopting from our Common Version what seems to me the harsh and unauthorized interpretation, “unto the resurrection of damnation.”

explaining more or less plausibly what is expressly revealed. Take, if you will, the theory of the pre-existence of the soul, through which we can explain the doctrine of inherited sin. You see at once all that can be said against the opposite opinion—that of the successive creation of souls—and the advantage of the theory of pre-existence for a multitude of interesting explanations. Now, I do not adopt this theory as a portion of accredited belief; but it may reasonably be asked, that if I, poor weak mortal, can thus find a hypothesis not at all absurd, which solves perfectly an otherwise embarrassing problem, may I not suppose, even if this theory be not true, that there is some other solution of the difficulty, which we now know nothing of because God has refused it to our idle curiosity? As much might be said of Leibnitz's ingenious hypothesis respecting the crime of Sextus Tarquinius, which he has so ably developed in his Theodicy; and one might reason in like manner concerning a hundred other systems. Provided they are modestly proposed only to tranquillize the mind, and are not regarded as demonstrated truths, they will not conduce to pride or tempt us to undervalue the authority of revelation."

Foremost among these open questions, as they may be termed, is that which concerns what is called the intermediate state. What becomes of the soul, we naturally inquire, during the indefinite interval between the dissolution of the body and the Final Judgment? We turn away with aversion, almost with terror, from the doctrine of the sleep of the soul during this long period, maintained tho it be by Archdeacon Blackburn, Bishop Law, and a few other authorities in the English Church. Interpreting literally the saying of St. Paul, "As by man came death, by man came also the resurrection of the dead," Dr. Law held, "that Jesus Christ at his second coming will, by an act of his power, restore to life and consciousness the dead of the human species, who, by their own nature and without this interposition, would remain in the state of insensibility to which the death brought upon mankind by the sin of Adam had reduced them." But an immortality the entrance upon which is to be so long deferred seems terribly like annihilation. If retribution can be thus postponed, if the dreamless sleep can be thus continued through indefinite ages without infringing the claims of

justice, it would seem almost a gratuitous act to waken the soul again to consciousness.

But the prevailing opinion in the English Church, as well as in most denominations of Protestant Christians, is that the soul at death enters immediately upon the state of reward or punishment awarded to it as its due by infinite justice, wisdom, and love combined. There is a Hades, an under-world, the invisible place of departed spirits, Christ's descent into it after his crucifixion being affirmed in that venerable symbol of the Christian church, the Apostles' Creed. One of its divisions is paradise, the region of the blessed, and the other is a place of punishment for the impenitent sinner; and the doctrine that the soul enters at once upon this new stage of its existence is held to be taught by our Saviour in his assurance to the penitent thief on the cross, "*To-day* shalt thou be with me in paradise." The same immediacy of retribution is thought to be shadowed forth in the parable of Dives and Lazarus; but this impressive apologue, as we shall see, lends itself far more plausibly to a different interpretation.

The obvious objection to this theory of the intermediate state is, that it either does away altogether with our belief in a solemn day of final judgment at once for all mankind, or reduces it in our conception to a needless ceremony, all the consequences of which have been anticipated. The Romanist doctrine of purgatory avoids this objection, since it gives a meaning and a purpose to the limited expiatory pains endured in the intermediate period, as they are held to purify the soul from the effects of sin, and thus to fit it for unbroken and unlimited happiness thereafter. The duration of these penalties, moreover, may be shortened through the intercession of the saints and the church militant, and thus an encouragement is afforded to the bereaved to make known their longings and their hopes through prayers for the dead. Sternly to forbid such prayers, as Protestants generally do, seems harsh, since it rebukes what we must admit to be a natural tendency of the sorrowing, and makes divine justice appear dark and forbidding, because inexorable. Of course, the Protestant argument is, that this doctrine of purgatory rests only on tradition and the authority of the church, having little or no support from Scripture.

Still another theory is conceivable, which I venture to propose only with great diffidence, because it has no weight of authority in its favor, tho it has long seemed to me an obvious and justifiable hypothesis, supported by some intimations in the New Testament, and better than any other to reconcile the conflicting claims of perfect justice and infinite mercy, and thus to vindicate the ways of God with man. The doctrine of metempsychosis, or the transmigration of souls, may almost claim to be a natural or innate belief in the human mind, if we may judge from its wide diffusion among the nations of the earth and its prevalence throughout the historical ages. It has been held by the Brahmans and the Bouddhists as far back as we can trace their history. It formed a part of the religion of ancient Egypt. It was expressly taught by Pythagoras and Plato, and was adopted from them by most of the philosophical sects who built upon their foundations. We find a simple and pleasing exposition of the doctrine, unexceptionable in its moral tone and clothed in magnificent diction, in the sixth book of the *Æneid*. A belief so widely diffused may not unreasonably be held, like the gift of language and of fire, to have formed part of a primitive revelation from God to man.

Our life upon earth is rightly held to be a discipline and a preparation for a higher and eternal life hereafter. But if limited to the duration of a single mortal body, it is so brief as to seem hardly sufficient for so grand a purpose. Threescore years and ten must surely be an inadequate preparation for eternity. But what assurance have we that the probation of the soul is confined within so narrow limits? Why may it not be continued, or repeated, through a long series of successive generations, the same personality animating one after another an indefinite number of tenements of flesh, and carrying forward into each the training it has received, the character it has formed, the temper and dispositions it has indulged, in the stage of existence immediately preceding? It need not remember its past history, even while bearing the fruits and the consequences of that history deeply ingrained into its present nature. How many long passages of any one life are now completely lost to memory, tho they may have contributed largely to build up the heart and the intellect which distinguish one man from an-

other! Our responsibility surely is not lessened by such forgetfulness. We are still accountable for the misuse of time, tho we have forgotten how or on what we wasted it. We are even now reaping the bitter fruits, through enfeebled health and vitiated desires and capacities, of many forgotten acts of self-indulgence, wilfulness, and sin—forgotten just because they were so numerous. Then a future life even in another frail body upon this earth may well be a state of just and fearful retribution.

Why should it be thought incredible that the same soul should inhabit in succession an indefinite number of mortal bodies, and thus prolong its experience and its probation till it has become in every sense ripe for heaven or the final judgment? Even during this one life, our bodies are perpetually changing, tho by a process of decay and restoration which is so gradual that it escapes our notice. Every human being thus dwells successively in many bodies, even during one short life. This physiological fact seems to have been known by Plato, as in a well-known passage of the *Phædo*, a clear statement of it is put into the mouth of Cebes, who argues, however, that this fact affords no sufficient proof of the immortality of the soul. "You may say with reason," Cebes is made to argue, "that the soul is lasting, and the body weak and short-lived in comparison. And every soul may be said to wear out many bodies, especially in the course of a long life. For if, while the man is alive, the body deliquesces and decays, and yet the soul always weaves her garment anew and repairs the waste, then of course, when the soul perishes, she must have on her last garment, and this only will survive her; but then, again, when the soul is dead, the body will at last show its native weakness and soon pass into decay." And again: "Suppose we admit also that, after death, the souls of some are existing still, and will exist, and will be born and die again and again, and that there is a natural strength in the soul which will hold out and be born many times—for all this, we may still be inclined to think that she will be weary in the labors of successive births, and may at last succumb in one of her deaths and utterly perish."¹

¹ Jowett's translation, *Am. ed.*, vol. i. p. 416.

In the Dialogue, Socrates admits, with Cebes, that this one fact, taken alone, does not sufficiently prove that the soul will never die; and he proceeds to argue in defence of immortality on other grounds. But what we are here especially concerned to notice is the assertion, made in the passage cited, that "the soul always weaves her garment anew and repairs the waste." This is a distinct statement by anticipation of the modern physiological doctrine taught by Stahl, Bouillier, Hartmann, and other animists, that the soul has a plastic power, and is thus an unconscious agent of Deity in constructing its own corporeal organism. As bees and birds instinctively fashion their own curiously wrought cells and nests with an art which is not their own, since they know nothing of the admirable adaptations of the parts to each other, or of the uses which the whole structure is to subserve, we may well believe that they also blindly put together, from the earliest embryonic stage upwards, the whole fabric of their own bodies. The animal's own will is the operative agent, the purpose and the guidance are divine. This is the essential purport of Dr. Cudworth's noted hypothesis of "a plastic nature." The primal germ of all animal life, from the animalcule up to man, is a minute speck too small to be discerned except by the highest power of the microscope. And yet this is all which is directly inherited from the parent; all the other portions of the completed structure are subsequently brought from without and superinduced upon this speck by epigenesis. Now which is the more probable hypothesis? That of the materialist, that within this infinitesimal germ is lodged a most complex and elaborate apparatus, which blindly and mechanically builds up, step by step, the whole animal organism with all its artistic arrangement of parts and capacities of action? Or that of the spiritualist, who holds that a principle of life—in the case of man, a living soul—is attached to that speck by a divine hand, and then this vital principle, God-guided, weaves for itself its own future habitation? The unconscious action of mind or instinct in keeping up the organism through repairing its waste, healing its wounds, and remedying its hurts, is recognized by most scientific observers. Then we may well believe with Plato, that as "the soul always weaves her garment anew," and thus reconstructs the body many times during one short

life, it also has "a natural strength which will hold out and be born many times," at each successive birth fashioning for itself anew its future home.

If every birth were an act of absolute creation, the introduction to life of an entirely new creature, we might reasonably ask why different souls are so variously constituted at the outset. We do not all start fair in the race that is set before us, and therefore all cannot be expected, at the close of one brief mortal pilgrimage, to reach the same goal and to be equally well fitted for the blessings or the penalties of a fixed state hereafter. The commonest observation assures us that one child is born with limited capacities and perhaps a wayward disposition, strong passions, and a sullen temper; that he has tendencies to evil which are almost sure to be soon developed. Another, on the contrary, seems happily endowed from the start; he is not only amiable, tractable, and kind, but quick-witted and precocious, a child of many hopes. The one seems a perverse goblin, while the other has the early promise of a Cowley or a Pascal. The differences of external condition also are so vast and obvious that they seem to detract much from the merit of a well-spent life and from the guilt of vice and crime. One is so happily nurtured in a Christian home, and under so many protecting influences, that the path of virtue lies straight and open before him—so plain, indeed, that even the blind could safely walk therein; while another seems born to a heritage of misery, exposure, and crime. The birthplace of one is in Central Africa, and of another in the heart of civilized and Christian Europe. Where lingers eternal justice then? How can such frightful inequalities be made to appear consistent with the infinite wisdom and goodness of God?

If metempsychosis is included in the scheme of the divine government of the world, this difficulty disappears altogether. Considered from this point of view, every one is born into the state which he has fairly earned by his own previous history. He carries with him from one stage of existence to another the habits or tendencies which he has formed, the dispositions which he has indulged, the passions which he has not chastised, but has voluntarily allowed to lead him into vice and crime. No active interference of retributive justice is needed, except in

selecting for the place of his new birth a home with appropriate surroundings—perhaps such a home as through his evil passions he has made for others. The doctrine of inherited sin and its consequences is a hard lesson to be learned. We submit with enforced resignation to the stern decree, corroborated as it is by every day's observation of the ordinary course of this world's affairs, that the iniquity of the fathers shall be visited upon the children even to the third and fourth generation. But no one can complain of the dispositions and endowments which he has inherited, so to speak, from himself; that is, from his former self in a previous stage of existence. If, for instance, he has neglected his opportunities and fostered his lower appetites in his childhood, if he was then wayward and self-indulgent, indolent, deceitful, and vicious, it is right and just that, in his manhood and old age, he should experience the bitter consequences of his youthful follies. If he has voluntarily made himself a brute, a brute he must remain. The child is father of the man, who often inherits from him a sad patrimony. There is an awful meaning, if we will but take it to heart, in the solemn announcement of the angel in the apocalyptic vision: "He that is unjust, let him be unjust still; and he which is filthy, let him be filthy still; and he that is righteous, let him be righteous still; and he that is holy, let him be holy still." And it matters not, so far as the justice of the sentence is concerned, whether the former self, from whom we receive this heritage, was the child who, not many years ago, bore the same name with our present self, or one who bore a different name, who was born in another age and perhaps another hemisphere, and of whose sad history we have not now the faintest remembrance. We know that our personal identity actually extends farther back, and links together more passages of our life, than what is now present to consciousness; tho it is true that we have no direct evidence of this continuity and sameness of being beyond what is attested by memory. But we may have indirect evidence of it from the testimony of others in the case of our own infancy, or from revelation, or through reasoning from analogy and from the similarity of cases and characters. The soul, said the Hindoos, is in the body like a bird in a cage, or like a pilot who steers a ship and seeks a new vessel when the old one is worn out.

Who shall say, then, that the doctrine of original sin is necessarily an impeachment of God's justice? If the theory which I am now setting forth is well founded, such sin is an immediate and grand manifestation of such justice.

This ethical significance, as it may be called, of the doctrine of the transmigration of souls, this aspect of it in which it appears as holding the balance even, immediately and inseparably uniting holiness with its reward and sin with its punishment, is its essential feature according to the Brahmins and the Buddhists, and one upon which they place the greatest stress, tho they carry out the retribution, as might be expected, into needless and whimsical details. They teach that whatever sufferings we wrongly inflict upon others in this life must be expiated in a future state by enduring precisely similar sufferings in our own person; even he who wantonly maims or kills a brute animal will, at some day in the infinite future, be born again as such an animal, and will suffer the same mutilation or death. If we are pitiless in beholding the hunger and nakedness of others while here, our own cry for compassion will not be heard when we shall be called to endure the like evils hereafter. The parts will be interchanged; the oppressor and his victim, the tyrant and his slave, will change places with each other. All this may seem fanciful enough; but it is an apologue which involves a great truth, for it is essentially the same lesson which is so impressively taught in the parable of Dives and Lazarus. The time of expiation is there represented as continuous and parallel with the life that now is; for the rich man, after the agonized cry wrested from him by his own sufferings, "Have mercy on me!" prays that a message may be sent to those who are still living, to his five brethren, that they may be called to repentance. We need not fix any arbitrary limit here between imaginative illustration and literal truth; for we are only concerned with the moral of the story, which is all contained in the solemn monition, "Son, remember that thou in thy lifetime receivedst thy good things, and likewise Lazarus evil things; but now he is comforted, and thou art tormented." Considered either as parable or prophecy, it is an accurate picture of the immediacy and the even measure of God's justice. The Latin poet who seems to have imbibed most of the spirit of Christianity, while

ignorant of its letter, teaches essentially the same truth: "*Quisque suos patimur manes*"—each one of us suffers his own appropriate punishment.

The pantheists also, or rather those who teach the absolute unity of all things without admitting any form of theism, draw a similar picture of the immediacy and the essential nature of eternal justice, while seeking only to interpret the voice of conscience in conformity with their peculiar doctrine. Temporal justice, as it is administered by man through the institutions of society, through its apparatus of judicial tribunals and prisons and scaffolds, always admits delay between the criminal act and its retributive consequences; for, as its name imports, it takes place under the form of time, and needs time in order to be carried out. Hence the arm of such justice is slow to strike and uncertain in its aim, so that it often fails altogether. Not so with eternal justice, which is above or beyond time, so that the offence and its punishment are inseparably connected as one and the same event, because there is no real or absolute distinction, but only a phenomenal one, between the offender and the offended. He who injures another in fact wrongs himself; to adopt Schopenhauer's striking figure, he is only a wild beast who fastens his fangs in his own flesh. We cannot accept this theory, as it is founded upon a denial of the self-evident truth attested by every one's consciousness, that, at any one moment, he is a distinct personality separate from that of every other human being. The difference between you and me is more than phenomenal; conscience as well as consciousness declares that it is complete and absolute.

Nothing prevents us, however, from believing that the probation of any one soul extends continuously through a long series of successive existences upon earth, each successive act in the whole life-history being retributive for what went before. For this is the universal law of being, whether of matter or mind; everything changes, nothing dies in the sense of being annihilated. What we call death is only the resolution of a complex body into its constituent parts, nothing that is truly one and indivisible being lost or destroyed in the process. In combustion or any other rapid chemical change, according to the

admission of the materialists themselves, not an atom of matter is ever generated or ever ceases to be ; it only escapes from one combination to enter upon another. Then the human soul, which, as we know from consciousness, is absolutely one and indivisible, only passes on after the dissolution of what was once its home to animate another body. In this sense we can easily accept the doctrine of the resurrection of the body. Our future life is not, at any rate not while the present administration of this world's affairs continues, to be some inconceivable form of merely spiritual being. It will be clothed again with a body, which may or may not be in part the same with the one which it has just left. Leibnitz held that the soul is never entirely divorced from matter, but carries on some portion of what was its earthly covering into a subsequent stage of existence. Hence, while we cannot admit the dream of the Eleatic and the pantheist that *all is one*, that there is no separate individual being, that the distinction between you and me and all other beings who even now walk the earth is only phenomenal or apparent, like the difference between the many images of the moon in countless pools of water, all of which are mere *representations of the one* moon up there among the clouds—I say, while we cannot admit this senseless and inconceivable doctrine, for it is contradicted by the clearest dictates of consciousness, we can easily imagine and believe that every person now living is a *representation* of some one who lived perhaps centuries ago under another name, in another country, it may be not with the same line of ancestry, and yet one and the same with him in his inmost being and essential character. His surroundings are changed ; the old house of flesh has been torn down and rebuilt ; but the tenant is still the same. He has come down from some former generation, bringing with him what may be either a help or a hindrance ; namely, the character and tendencies which he there formed and nurtured. And herein is retribution ; he has entered upon a new stage of probation, and in it he has now to learn what the character which he there formed naturally leads to when tried upon a new and perhaps broader theatre. If this be not so, tell me why men are born with characters so unlike and with tendencies so depraved. In a sense

far more literal than was intended by the poet, it may be true of every country church-yard, that

"Some mute inglorious Milton there may rest,
Some Cromwell guiltless of his country's blood."

They bring with them no recollection of the incidents of their former life, as such memory would unfit them for the new part which they have to play.

"Animæ, quibus altera fato
Corpora debentur, Lethæi ad fluminis undam
Securos latices et longa oblivia potant.
Scilicet immemores supera ut convexa revisant."

But they are still the same in the principles and modes of conduct, in the inmost springs of action, which the forgotten incidents of their former life have developed and strengthened. They are the same in all the essential points which made them formerly a blessing or a curse to all with whom they came immediately in contact, and through which they will again become sources of weal or woe to their environment. Of course, these inborn tendencies may be either exaggerated or chastised by the lessons of a new experience, by the exercise of reflection, and by habitually heeding or neglecting the monitions of conscience. But they still exist as original tendencies, and as such they must make either the upward or the downward path more easy, more natural, and more likely to reach a goal so remote that it would otherwise be unattainable.

To make this more clear, let me refer to the pregnant distinction so admirably illustrated by Kant between what he calls the Intelligible Character and the Empirical or acquired Character. The former is the primitive foundation on which the latter, which directly determines our conduct for the time being, is built. To a great extent, tho not entirely, we are what we are through the influence of what have been our surroundings—through our education, our companions, our habits, and our associations. But these influences must have had a primitive basis to work upon, and can only modify the operation of the native germs, not change their nature; and they will modify these more or less profoundly according as they are

more or less amenable to outside influences and manifest more or less decidedly a bias in one direction or another. What the future plant will be depends much more on the specific nature of the seed which is sown than on the fertility or barrenness of the soil into which it is cast. The latter only determine whether it shall be a vigorous plant or a weak one, whether in fact it shall grow at all or only rot in the ground ; but they do not determine the specific direction of its development, whether it shall be an oak, a willow, or an ivy bush. The empirical or acquired character, as it is open to observation, is a phenomenon ; it is what the man *appears* to be, or what he has become under the shaping influence of the circumstances to which he has been exposed. But the Intelligible Character, the inmost kernel of his real being, is a noumenon, and escapes external observation ; we can judge of its nature only indirectly from its effects ; that is to say, from the conduct which it has co-operated to produce. A change taking place in any substance must be the joint result of two factors ; namely, its proper cause operating upon it from without, and the thing's own nature or internal constitution. Thus the same degree of heat acts very differently upon different substances, say, on wax, iron, water, clay, or powder. In like manner, a given motive, say, the desire of wealth, when acting on different persons, tho with the same strength or intensity, may lead to very dissimilar results ; it makes one man a thief and another a miser, renders one envious and another energetic and industrious. If frequently indulged, it forms a fixed habit, and thus becomes an element in the acquired or empirical character.

Now Kant, with the bias of a necessitarian, places our freedom and our responsibility in the realm of noumena, attributing them exclusively to our Intelligible Character. As to the acquired character when once formed, he says we *must* act in accordance with it, and therefore we are not accountable for the particular act to which it led, since that we could not help. After I have once formed a habit of lying or stealing, should an opportunity and temptation recur, I *must* repeat the offence. But our inborn character, which expresses what we really are, as a noumenon, lies outside of time, space, and causality, and therefore cannot be led astray by temptation or external cir-

cumstances, but is entirely free. Herein solely consists our merit or our guilt. Hence Kant would make us responsible not for the particular crime, which we could not help committing, but for being such a person as to be capable of that crime. We are accountable not for what we do, but for what we are. We are to be punished not for stealing this horse, but for being a rogue or thief in grain, for being naturally inclined to stealing.

It would seem, however, that this theory completely reverses the verdict of natural justice, which declares that we might have resisted the force of habit and special temptation, and consequently that we are punishable for the particular act; while on the other hand, we could not help being born with a feeble or depraved character, but in so far, we are objects rather of compassion than of censure. And yet Kant is right in the latter half of his theory, since conscience unmistakably testifies that we are responsible for our inmost nature; that is, for our innate tendencies to wrong-doing or its opposite. We do not esteem a truthful person any the less because he is so happily constituted that he cannot help telling the truth; rather this fact enhances our respect for his character. And we detest a falsehood all the more if he who utters it has been a liar from the beginning. Now it seems to me that this instinctive action of conscience in awarding merit or guilt rather to the primitive and inborn character of the man, to "the one permanent individuality which continues unchanged through all the various modes of consciousness," than to any particular act in which that character and individuality happen to be manifested, can be explained only by accepting that paradoxical portion of Kant's theory, which declares that we were free to make our own inmost nature, our permanent individuality, other than it is, and we are therefore responsible for its perversion. That the man was thoroughly bad, bad from the beginning, surely makes him more hateful than if he had been merely tempted into a single act of sin which marred the uniformity of a character otherwise pure and blameless. But this strange fact, that we are even more responsible for what we are than for what we do, can be accounted for only by supposing that we freely made ourselves what we are in a previous stage of probationary being. Only through voluntary persistence in wrong-doing at some former

period, only through frequently yielding then to temptation, could we have formed the depraved habits and tendencies which appeared ingrained into our inmost nature from the very beginning of our present life. And conversely, a nature happily endowed from the start must be the reward, as it is the necessary consequence, of virtuous habits and a steadfast adherence to the right through a former state of existence.

I know not how it may seem to others, but to me there is something inexpressibly consolatory and inspiring in the thought that the great and good of other days have not finally accomplished their earthly career, have not left us desolate, but that they are still with us, in the flesh, tho we know them not, and tho in one sense they do not really know themselves, because they have no remembrance of a former life in which they were trained for the work which they are now doing. But they are essentially the same beings, for they have the same intellect and character as before, and sameness in these two respects is all that constitutes our notion of personal identity. We are unwilling to believe that their beneficent activity was limited to one short life on earth, at the close of which there opened to them an eternity without change, without farther trial or action, and seemingly having no other purpose than unlimited enjoyment. Such a conception of immortality is exposed to Schopenhauer's sarcasm, that if effort and progress are possible only in the present life, and no want or suffering can be endured except as the penalties of sin, there remains for heaven only the weariness of nothing to do. An eternity either of reward or punishment would seem to be inadequately earned by one brief period of probation. It is far more reasonable to believe that the future life which we are taught to expect will be similar to the present one, and will be spent in this world, tho we shall carry forward to it the burden or the blessing entailed upon us by our past career. Besides the spiritual meaning of the doctrine of regeneration, besides the new birth which is "of water and of the Spirit," there may be a literal meaning in the solemn words of the Saviour, "Except a man be born again, he cannot see the kingdom of God."

It would be a fanciful and bootless task for us to attempt, even in a single instance, to trace the same person through a

succession of earthly lives. When the body and all its surroundings are altered, when the modes of action are new and the results different, it needs more than human sagacity to perceive that the character is still the same. Only he who reads the heart can know, after the whole environment of outward circumstances is changed, that the personality still endures and has suffered no break in the essence of its life's history. When even our Lord, after his resurrection, first appeared to Mary Magdalene and to the two disciples at Emmaus, familiar as they had been with his external appearance, we read that "their eyes were holden that they should not know him." Then we can have a more lively faith in the truth of the last promise which he made to them, "And lo, I am with you alway, even unto the end of the world." Even in this earthly life, at the various stages of its history, there is room for a richly varied experience; there are countless fields for distinct effort in it, and we may not measure the importance of the work to be done in any one of them by what the world thinks of its dignity or the largeness of its results. The saintly Carlo Borromeo was a cardinal and a prince, and therefore found the whole north of Italy but a narrow theatre for the incessant warfare which he waged, often at the peril of his life, against all forms of sickness, sorrowing, and sin. He was canonized not long after his death, and the gigantic statue of him which crowns a height near Arona is appropriately visible for many leagues around, tho by no means so far as his philanthropic influence extended. If, after the dissolution of his body, his beneficent spirit was still allowed to walk the earth in a mortal form, it might perhaps be found, not in any lofty and conspicuous station, but in the seclusion of a remote Alpine valley, where an Oberlin taught, loved, and helped his brother-man. Luther was born in an age when a great crisis was imminent in the world's affairs, and his indomitable spirit, his fervent convictions, and his restless energy had full scope and play in the opening scenes of the Reformation. If a mind and character the same as his could anywhere be traced in the subsequent history of the world, perhaps it might be detected within the fold of the very church which he strove to overthrow, in him who was called "the great Arnauld," who, persecuted and in exile during the greater part of his long life, still

bated not a jot of heart or hope, but fought on and prayed on in defence of a sinking cause, and whose collected works in philosophy and theology occupy fifty folio volumes. Late in life, when his friend and coadjutor Nicole besought him to lay down the pen and take some repose, he exclaimed, "Rest! Shall we not have all eternity to rest in?" "Probably not," I should answer; for surely a heaven in which there was nothing to do would be no heaven to him. Jansenism as a distinctive sect and creed hardly survived the death of its founders, and has now long been entirely extinct. But I should be sorry to believe that that remarkable group of excellent scholars, thinkers, and divines, the Port-Royalists, who upheld the cause of Jansenism for three quarters of a century, have finally passed away from earth. On the contrary, if anywhere in these later times the model of a Christian scholar and historian could be found, we might well say that the spirit of Tillemont lives again in him. If we could find one who united in himself all the best qualities of a Christian teacher stainless in heart and life, we might well believe that it was Lancelot in another earthly form. For either Pascal or Arnauld, it must be admitted that we should not know where to look; if their spirits are yet in this world, they must be in the obscurity of some lowly station.

All this speculation, I repeat, is completely fanciful, and can serve no other purpose than to show, even if the doctrine of metempsychosis were true, that we should not be able to identify one person in any two of his successive appearances upon earth. We surely could not know of him in this respect any more than he knows of himself; and as already said, the total break in memory at the beginning of every successive life must prevent the newly born from recognizing the oneness of his own being with any former existence in an earthly shape.

Curiously enough this want of self-knowledge is confessed in the only case in which we have a direct assertion in Scripture, (if language is to be interpreted in its ordinary literal meaning, and not strained into a figurative sense), that one of the heroes of the olden time had reappeared upon earth under a new name, as the forerunner of a new dispensation. At the time of the Saviour, there appears to have been a general expectation among the Jews, that the coming of the Messiah was to be heralded by

the reappearance upon earth of the prophet Elijah, this expectation being founded upon the text in Malachi, "Behold, I will send you Elijah the prophet before the coming of the great and dreadful day of the Lord." Early in the public ministry of John the Baptist, we read that the belief prevailed among his hearers that this prophecy was fulfilled in him. But when directly asked, "Art thou Elias?" he replied, "I am not. Art thou that prophet? And he answered, No." He had no memory of his former life under that name; and tho he must have been aware of the popular belief upon the subject, and of the many points of similarity between his own career and that of the great restorer of the worship of the true God at an earlier period, he was too honest to claim an authority which he did not positively know to belong to him.

Yet we learn that our Lord subsequently twice declared, in very distinct language, that Elijah and John the Baptist were really one and the same person. Once, while John was still alive but in prison, Jesus told the multitude who thronged around him, "Among them that are born of women there hath not risen a greater than John the Baptist;" and he directly goes on to assert, "if ye will receive it, *this is Elias*, which was for to come" (Matt. xi. 14). And again, after John was beheaded, Jesus said to his disciples, "Elias is come already and they knew him not, but have done unto him whatsoever they listed." "Then the disciples understood that he spake unto them of John the Baptist." (Matt. xvii. 12, 13.) Still again, in the scene on the mount of Transfiguration, "behold there talked with him two men, which were Moses and Elias;" and it is said of the three disciples who were then in company with Jesus that, "when they were awake, they saw his glory and the two men that stood with him." (Luke ix. 30, 32.) That the commentators have not been willing to receive, in their obvious and literal meaning, assertions so direct and so frequently repeated as these, but have attempted to explain them away in a non-natural and metaphorical sense, is a fact which proves nothing but the existence of an invincible prejudice against the doctrine of the transmigration of souls.

This prejudice is largely attributable, as it seems to me, to a corrupt admixture of the proper doctrine with oriental fables

respecting the interchange of souls between human beings and the brute creation. But in the sixth book of Virgil, where the dogma is probably stated in the form in which it was accepted, if at all, by cultivated minds among the Greeks and Romans about the time of our Lord's ministry, this idle and offensive corruption of it does not appear. Certainly I do not accept the hypothesis of the transmigration of souls between men and the lower animals, because I do not believe that these animals have any souls to migrate. This wild Indian fable may be left to the credulity of our modern evolutionists, who can believe that birds are generated from fishes, and that man was born of a monkey. The gulf between the mental constitution of the highest brutes—anthropoid apes, for instance—and a human soul, capable even in its lowest state of progress, language, free will, morality, and religion, is so broad and deep that those who believe it can be bridged over had better not talk about the incredibility of miracles. The only high endowment of merely animal life, that of instinct, is, as I have elsewhere argued, not a free and conscious power of the subject in which it appears and works. It is, so to speak, a foreign agency, which enters not into the individuality of the brute. The animal appears subject to it, controlled and guided by it, but not to possess and apply it for its own chosen purposes. In its highest functions the brute appears only as the blind and passive instrument of a will which is not its own.

“And Reason raise o'er Instinct as you can,
In this 'tis God directs, in that 'tis man.”

The power thus granted to it for a time cannot be improved by practice, is invariably applied in the same way and with perfect success, and disappears when it is no longer needed. No moral character is attributable to a faculty which is thus unconsciously exerted, and no moral aim can exist where progress or change is impossible. When deprived of this extraneous power, or viewed apart from it, the brute appears in its true light as the creature of a day, born for purposes not connected with its own being, but as an humble instrument or means in the great circle of animated nature, which, as a whole, is subservient to higher ends. In the General Scholium to his “Optics,” Sir Isaac Newton rightly says, “The instinct of brutes and insects can be

nothing else than the wisdom and skill of a powerful ever-living Agent, who, being in all places, is more able by his will to move all bodies, and thereby to form and reform the parts of the universe, than we are by our will to move the parts of our bodies."

There is ample room and verge enough for the action of metempsychosis within the limits of the human race, excluding the brute animal kingdom altogether. The interval between a Newton and an Australian savage, between a St. Louis and an Attila or a Genkhis Khan, is vast enough to afford scope for indefinite moral advancement or degradation, even if the history of the world thus far showed all that either holiness or wickedness in a human shape is capable of; and, always excepting on the former side Him who was both human and divine, there is not the least reason to believe that the limits of what is possible for human nature either way have yet been reached. Assuming the doctrine to be well founded, it is for every person to determine with what character he will leave the world at the close of one stage of his earthly being, believing that with this same character thus trained for weal or woe he is inevitably at once to begin a new life, and thus either to rise or fall farther than ever. It seems to me that the dogma of a future life, so prolonged through a countless succession of other lives on earth until it becomes an immortality, is thus brought home to one with a force, a vividness and certainty, of which in no other form is it susceptible. It has been said that no prudent man, if the election were offered to him, would choose to live his present life over again; and as he whom the world calls *prudent* does not usually cherish any lofty aspirations, the saying is probably true. We are all so conscious of the many errors and sins that we have committed that the retrospect is a saddening one; and worldly wisdom would probably whisper, "It is best to stop here, and not try such a career over again." But every one would ardently desire a renewal of his earthly experience if assured that he could enter upon it under better auspices, if he believed that what we call death is not the end of all things even here below, but that the soul is then standing upon the threshold of a new stage of earthly existence, which is to be brighter or darker than the one it is just quitting according as there is carried forward into it a higher or lower purpose, a purer or

more corrupt nature, than the one it began with perhaps half or three quarters of a century ago. As applied to describe our condition in a future life thus understood, the much-abused words, heaven and hell, would have a more obvious and intelligible sense, a meaning less exposed to captious objections and scoffs, than could be given to them on any other interpretation. We should thus understand the full purport of our Saviour's solemn declaration that they do not mean any particular place, but only a state of mind: "They shall not say, Lo here! or, lo there! for, behold, the kingdom of God is within you." We could then apply to the whole succession of lives of any individual soul what Lacordaire finely says of any one life, that it may be made a series of metempsychoses or transfigurations which constantly lead the soul nearer to God.

This doctrine also suggests, as it seems to me, a clearer and more satisfactory explanation than would otherwise be possible of the fall of man through disobedience and its consequences, as narrated in Genesis and interpreted by St. Paul. Certainly the primeval man, the Adam of each one of us, when he first through the inspiration of Deity "became a living soul," was born into a paradise, an Eden, of entire purity and innocence, and in that state he talked directly with God. There was also given to him through his conscience the revelation of a divine law, an absolute command, to preserve this blessed state through restraining his appetites and lower impulses to action, and making the love of holiness superior even to the love of knowledge. But man was tempted by his appetites to transgress this law; he aspired after a knowledge of good and evil, which can be attained only through experience of evil, and he thereby fell from innocence into a state of sin, which necessarily corrupted his whole future being. The habit of disobedience once formed, sin in the same person has a self-continuing and self-multiplying power. The stain carried down from a former life becomes darker and more inveterate in the life that follows. We have no reason to complain of the corruption of human nature, for the world is what we have made it to be by our own act. The burden has not been transmitted to us by others, but has been inherited from ourselves; that is, from our former selves. Redemption from it by man's own effort thus became impossible.

This is death, moral death, the only death of which a human soul is capable. It is so called in the parable, where the father, speaking of the prodigal son's return, says of him, "For this thy brother was dead, and is alive again; was lost, and is found." Salvation became possible only through the Incarnation, by a new creation, by the appearance of a sinless and divine nature in a human form, reconciling the world unto God. And this appears to be the full meaning of St. Paul's language: "For since by man came death, by man came also the resurrection of the dead. For as in Adam all die, even so in Christ shall all be made alive."

Thus far we have considered metempsychosis as a means of retribution; that is, of awarding to each soul in the next future life upon which it is entering that compensation either of weal or woe which it has earned for itself—has in fact necessarily entailed upon itself by its conduct in the life which it has just completed. But the transmigration of souls may be regarded also in another light, as that portion of the divine government of this world's affairs which maintains distributive justice, since, through its agency, in the long-run, all inequalities of condition and favoring or unfavoring circumstances may be compensated, and each person may have his or her equitable share of opportunities for good and of the requisite means for discipline and improvement. If our view be confined within the limits of a single earthly life, it must be confessed that the inequality is glaring enough, so that it seems to justify the honest doubts of the trembling inquirer, while it has offered a broad mark for the scoffs and declamation of the confirmed unbeliever. Dives and Lazarus form a contrast that is almost constantly before our eyes. It is a long way from a poor laborer's hut to a throne, and a still longer one from a birthplace in one of the sinks of misery and crime which pollute our great cities to the affectionate nurture of a comfortable Christian household. One saint must encounter martyrdom, while another, in a different age and country, seems to find the road to heaven comparatively straight and easy. There are some situations so degraded and miserable that they seem almost to take away the guilt of transgression by rendering goodness practically unattainable, while those who occupy them are hardly fit subjects either of praise

or censure. An Australian savage or a native New Zealander, as he was a century ago, could not have become by death a proper candidate for either the happiness or the misery of a spiritual immortality begun then and there. And yet one is reluctant to classify him with the brutes that perish; for, savage as he was, he was still man, having in him the germs of a moral and religious nature, which proper Christian culture could develop.

Now the parable gives us a simple and effective solution of these difficulties by merely suggesting that the immediately future life is also, like the present one, to be spent on this earth, only the position of the two characters in it being reversed; and a belief in such transposition would be always a desirable warning for Dives and a needed comfort for Lazarus. In this way, as it seems to me, a firm and well-grounded faith in the doctrine of Christian metempsychosis might help to regenerate the world. For it would be a faith not hedged round with many of the difficulties and objections which beset other forms of doctrine, and it offers distinct and pungent motives for trying to lead a more Christian life, and for loving and helping our brother-man. "And this also shall pass away" was the motto which a wise king had engraved on his signet, to temper alike his grief in adverse fortune and his exultation in prosperity. Even the old heathen poet, an avowed Epicurean, gives the same advice.

"Æquam memento rebus in arduis
Servare mentem, non secus in bonis
Ab insolenti temperatam
Lætitia, moriture Delli."

But no hog from Epicurus' sty ever put such counsel into the impressive form in which it is enforced in the parable. Nothing can teach so forcibly the essential brotherhood of all men as a belief that we are soon to experience in our own person all the varieties of condition to which human nature is subject; that the rich and the poor, the savage and the civilized man, the monarch and the peasant, are soon to change places with each other. We should thus learn to repeat with more earnestness than ever the Christian prayer,

"The mercy I to others show,
That mercy show to me."

For the probation which is to fit us for eternity must be comprehensive enough to leave no form of being untried, no temptation that has not been resisted, no trial that has not been borne, no opportunity for the exercise of pity, trust, and love left unimproved. Herein is no distinction of persons, and no one has any advantage over another, since all must complete the same long journey, and each must have essentially the same experience while on the road.

The doctrine is full of solemn warning then, but it is also full of consolation. For it teaches that the friends who have been separated from us by what we call death have only passed out of our limited field of sight, but are still in the body and really near us, are still tenanting the earth like ourselves, tho in forms which we cannot recognize. Intercession for the so-called dead, therefore, ceases to appear out of place or in any way objectionable; for they are not only still living, but living in a probationary state, exposed to trial, temptation, and suffering just as we are, and therefore as proper subjects for intercessory prayer as they were before they changed their name and dwelling-place. The intermediate state, considered as a series of existences of the same soul in a succession of earthly bodies, is a sort of purgatory, by passing through which the soul may, *if it will*, be purified from the stains of sin and regain its primitive Eden, its state of purity and innocence. If the fervent prayer of a righteous man availeth much, I cannot see why it should not aid in completing this happy work.

This hypothesis—and I do not claim for it any other character than that of a highly probable and consolatory hypothesis—also throws a new and welcome light upon the deep and dark problem of the origin of evil. In the first place, according to the views which have now been taken, the sufferings which are the immediate consequence and punishment of sin are properly left out of the account, since these evince the goodness of God no less than the happiness resulting from virtue, the purpose in both cases being to advance man's highest interests by the improvement of his moral character; just as the affectionate parent rewards the obedience and punishes the faults of his child, love equally constraining him to adopt either course. And how many of the evils borne both by individuals and by communities are

attributable directly to their own misconduct, to their wilful disregard of the monitions of conscience! The body which is now languid from inaction through sloth, and enfeebled or racked by disease, might have been active, vigorous, and sound, prompt to second every wish of its owner, and ministering to his enjoyment through every sense and limb. And could we know all, could we extend our vision over the whole history of our former self, how would our estimate of this purely retributive character of our present suffering be enlarged and confirmed! It would then be evident that no portion of it is gratuitous or purposeless. And the community which is now torn with civil dissension, desolated by war, or prostrated in an unequal strife with its rivals, might have been peaceful, affluent, and flourishing, if rulers and ruled had heeded the stern calls of duty, instead of blindly following their own tumultuous passions. And as nations, too, have a continuous life, like that of a river, through a constant change of their constituent parts, many of their woes are clearly attributable to the misdeeds of their former selves. Once admit the great truth, that virtue, not happiness, is man's highest interest, and most of the pains of this life indicate the goodness and justice of God quite as much as its pleasures.

But according to the theory which we are now considering, a still larger deduction must be made from the amount of apparent evil at any one time visible in the world. All the inequalities in the lot of mankind, which have prompted what are perhaps the bitterest of all complaints, and have served sceptics like Hume and J. S. Mill as a reason for the darkest imputations upon divine justice in the government of the world, disappear from the picture altogether. Excepting only, what we have just considered, the retributive consequences of more or less sin, there are no inequalities. All start from the same point, and journey through the same vicissitudes of existence, exhausting sooner or later all varieties of condition. Prince and peasant, bond and free, barbarian and cultured, all share alike whatever weal or woe there is in the world, because all must at some future time change places with each other. But after these two large deductions from the amount complained of, what remains? Very little, certainly, which we cannot even now see through; that is, which we cannot assign an adequate reason for; and to the

eye of faith nothing remains. The world becomes a mirror which reflects without blot or shadow the infinite goodness of its Creator and Governor. Death remains; but that is no evil, for what we call death is only the introduction to another life on earth, and if this be not a higher and better life than the one just ended, it is our own fault. Our life is really continuous, and the fact that the subsequent stages of it lie beyond our present range of immediate vision is of no more importance, and no more an evil, than the corresponding fact that we do not now remember our previous existence in antecedent ages. Death alone, or in itself considered, apart from the antecedent dread of it, which is irrational, and apart from the injury to the feelings of the survivors, which is a necessary consequence of that attachment to each other from which so much of our happiness springs, is not even an apparent evil; it is mere change and development, like the passage from the embryonic to the adult condition, from the blossom to the fruit.

Only one question remains, and it may be very briefly mentioned, as a full discussion of it evidently transcends the limited powers of a finite mind. This series of successive lives on earth, is it to be endless, or will it culminate at last in some grand manifestation of infinite justice and mercy combined? The answer in general terms cannot be a matter of doubt; for the scientific reason confirms what revelation also teaches, that this world had a beginning, and that it must also have an end. It is not more certain that "in the beginning, God created the heavens and the earth," than it is that the period will come when the present succession of days and nights will cease, and, the grand term assigned for probation being closed, all mankind must appear to meet their Judge. This is what John foresaw in the apocalyptic vision, when he beheld the angel stand upon the sea and upon the earth, who "lifted up his hand to heaven, and swore by Him that liveth for ever and ever that there should be time no longer."

We may even reverently conjecture what the nature of the account will be which each one must then render of all that he has thought or done during the whole period of his probation in the body. Most persons are acquainted with the facts, for they are numerous and well authenticated, which go to prove that the

latent and undeveloped powers of memory are vastly greater than those which are consciously under our control at any one time under ordinary circumstances; and that abnormal mental excitement, such as often results from high fever, delirium, or the passion and ecstasy of imminent and sudden death, may bring out into luminous consciousness all those stores of recollection which had thus been buried for many years. Leibnitz first directed attention to these singular phenomena; Coleridge cited from the German a remarkable case in point; and Sir W. Hamilton has collected a number of instances of such wonderful revival of memory. Whole languages, acquired in early childhood, but wholly forgotten in maturer years, have thus been recovered. Most old men, I suppose, have been perplexed at times by flashes and gleams from the memory thus occasionally stimulated into new life and vigor. The conclusion to be drawn from such phenomena is obvious enough, and cannot be better stated than by Coleridge, in his "Biographia Literaria," chap. vi.:

"As we cannot rationally suppose the feverish state of the brain to act in any other way than as a stimulus, this fact (and it would not be difficult to adduce several of the same kind) contributes to make it even probable that all thoughts are in themselves imperishable; and that, if the intelligent faculty should be rendered more comprehensive, it would require only a different and apportioned organization, *the body celestial* instead of *the body terrestrial*, to bring before every human soul the collective experience of its whole past existence. And this—this, perchance, is the dread Book of Judgment, in whose mysterious hieroglyphics every idle word is recorded! Yea, in the very nature of a living spirit, it may be more possible that heaven and earth should pass away than that a single act, a single thought, should be loosened or lost from that living chain of causes to all whose links, conscious or unconscious, the free will, our only absolute Self, is coextensive and co-present."

FRANCIS BOWEN.

THE SILVER QUESTION AND THE INTERNATIONAL MONETARY CONFERENCE OF 1881.

AS these lines are in writing, the delegates to the Third International Monetary Conference are on their way to their place of meeting. Before the words here written can be printed the deliberations of that body will probably have been brought to a close, and their conclusions will have become more or less distinctly known to the world. Nothing which can now be said can have any influence in affecting those conclusions; but as, whatever they may be, it is entirely too much to expect that they will give universal satisfaction, the subject will continue long to be discussed, and the public will be interested in the discussion.

It is a fact worthy of mention here that the motive which led to the call of the earliest of these international councils was very different from that which has prompted the later. Before 1867 the exciting controversy which has in more recent years been styled the "battle of the standards" had not begun. It was in that assembly indeed, and while its deliberations were in progress, that the war first regularly opened. The motive of the convention itself, however, was the hope of advancing, through its instrumentality, the progress of a movement which, with steadily growing activity and success, had been already going forward for about three quarters of a century, having an object no less important than the establishment among all nations of a perfect uniformity in the chief instrumentalities of commercial intercourse, the weights, measures, and moneys of the world. The almost endless diversity which from the earliest times has prevailed in the modes of estimating the quantities and values of exchangeable commodities in commerce has been one of the

most serious hindrances in the way of that intercourse between nations on which progress in civilization is so largely dependent.

It is a curious fact that the conception of a scheme so pregnant as this, with consequences of incalculable benefit to the human race, should have first presented itself to a European monarch in so dark a period of human history as the beginning of the fourteenth century. Philip V., surnamed *le long*, or the Tall, formed the project of establishing complete uniformity of weights and measures throughout his realm; but which, had it been successfully accomplished, would undoubtedly have induced similar reforms among neighboring peoples. He projected also a reform of the monetary system of France, which failed for a similar reason; but if he effected nothing in his efforts to improve the currency, he had at least the merit of leaving it in no worse condition than he found it—a remark which can hardly be made with truth of any of his predecessors, or even of his successors down to the middle of the eighteenth century. The noble disposition of this young monarch, who died prematurely in his 28th year, may be inferred from the reply which he made to certain courtiers and pretended friends, when urged by them to crush a supposed enemy: "*Il est beau,*" he answered, "*de pouvoir se venger, et de ne le pas faire.*"¹

The great reform so early projected by this enlightened ruler ceased with his premature death to occupy the minds of men; and for nearly five centuries it remained in the state of an abstract *beau idéal*, deemed probably incapable of a practical realization. At length, however, in the year 1790, it was energetically revived by a man destined to bear a conspicuous part in his country's history, the famous and sagacious Talleyrand, who in the year just named laid before the constituent assembly of France a proposition to invite the concurrence of the leading European nations in a scheme for the construction, on scientific principles, of a system of weights and measures for the common use of all mankind. The scheme so constructed it was proposed to substitute in place of all the endlessly numerous, discordant, and illogical systems then actually existing. The plan was favorably received, and in the first measures taken toward its prosecution

¹ Biographie Universelle, tom. 34, art. "Philippe le long."

France had the co-operation of Spain, Italy, Switzerland, the Netherlands, and Denmark. In the subsequent commission appointed to meet, and which in 1799 at length actually met, to settle the exact length of the unit-base of the system, derived from the great meridian survey which had occupied the intervening years, there were present the representatives of ten different governments.

Altho the original creation of a system involving, like the metric, for the determination of its first element, a great geodetic operation, extending through the third part of the lifetime of a generation, was in itself a work of vast magnitude, the introduction of the system into actual use after it had been perfected was an undertaking still more formidable. The first was an enterprise falling within the domain of exact science, and its successful accomplishment involved no question but that of time; the other was the task of statesmen who have to do with the whims and prejudices of men, and who often find their most earnest efforts for the public welfare frustrated by coming into collision with prescriptive usages and with the long-established habits of the many. Thus the metric system, real and immeasurable as are the advantages which, from the simplicity of its theory and the facility it introduces into calculations, it offers over every other for the transaction of the business of life, did not find immediate acceptance even in France; and it made its way still more slowly among neighboring peoples. About the middle of the present century, however, it had been legally and practically established not only in France and her colonies, but also in Spain, Portugal, Switzerland, Denmark, Greece, and some of the South American republics; and from that time onward adhesions were frequent on the part of other European powers. Among these there were, in Germany, Würtemberg, Bavaria, Baden, and Hesse, and, in Italy, Piedmont, Parma, Modena, the Pontifical States, and Naples. The system was also adopted on this continent by Mexico in 1856, and it extended itself gradually throughout the greater part of Central and Southern America, having been legalized in Brazil in 1862. This so rapid progress of a reform so important, a reform which has since extended itself to embrace the entire civilized world with the exception of Russia and the English-speaking peoples, stimulated a very gen-

eral desire to see the same degree of uniformity prevailing among the nations as to their means of estimating values which had already become so nearly universal in their modes of measuring quantity. A striking evidence of the prevalence of this feeling was seen in the proceedings of the Fifth International Statistical Congress held in Berlin in 1863. The object of these congresses, of which there have been held nine up to this time, has been to insure a thorough exploration of all the sources of national wealth and national strength throughout the world, as a basis on which to found enlightened legislation, and as a guide to direct the councils of international diplomacy. The nature of its avowed design rendered it necessary that this body, gathering its material indifferently from all lands, should adopt some common mode of estimating quantities; and it seemed almost equally necessary that there should be also employed some single system of estimating and computing values. It cost, of course, no long deliberation to arrive at the conclusion that for quantities the metric system of weights and measures should be used in all the proceedings of the congress and in all its published documents; but the money question was not so easily settled. The question of standard metals was not raised; but a very lively debate arose as to the proper unit of value. The pound sterling, the dollar, the florin, and the franc (the marc had not yet been created), all had their advocates; but neither party could command a majority of voices, and the congress arrived at last at the impotent conclusion that it would be advisable to conserve all these types.

Thus the congress could not agree upon a type; but the outside world who interested themselves in this matter were not on that account discouraged. On the contrary, there spread itself every day more and more widely a feeling that this object was one which was not only capable of being accomplished, but which ought to be accomplished, and which another conference called expressly *ad hoc* could not fail to accomplish. And out of this feeling grew the International Monetary Conference of 1867. It was expressly called to devise a scheme for the practical unification of the money and coinage of all nations. At the opening of the session this object was distinctly announced by the president.

The main question before this body was of course the question of an international monetary unit; but the discussion of this brought into immediate and unavoidable prominence the associated question, In what metal shall the representative of the common unit be struck? This question proved to be so absorbing in the interest it awakened that it occupied the attention of the conference for several days, to the exclusion of everything else. Three distinct propositions were presented for consideration: 1. To adopt the single standard of silver. This was rejected with entire unanimity, altho one half of the delegates voting were representatives of countries in which silver was at the time the standard actually existing. 2. To adopt the single standard of gold. In the discussion of this question, the entire argument in favor of the only remaining alternative, viz., the double standard of both gold and silver, was urged with persistence and ability, especially by Mr. Wolowski, representing France, who sustained that view with remarkable zeal and ingenuity. The conference, however, in the end approved the single gold standard by a vote which lacked but a single voice of unanimity, and thus practically disposed of the third and only remaining alternative—the double standard—at the same time.

The question of the standard metal was, however, only secondary to the main object for which the conference assembled, which was to decide on, if possible, and to recommend for universal and exclusive adoption, a common system equally of money of account and of its representative coinage, to be substituted for the variety of systems in actual use among the nations. This question was formulated in the following words, which we copy from the supplementary report on the proceedings of the conference, made in April, 1870, to the Department of State of the United States, by the Hon. Samuel B. Ruggles, delegate to the conference:

“By what means it is most easy to realize monetary unity: whether by the creation of a system altogether new and independent of existing systems, or by the mutual co-ordination of existing systems, taking into account the scientific advantages of certain types, and the numbers of the populations which have already adopted them?”

The first of the alternatives here presented, tho advoca-

ted by the representatives of Holland and Belgium, on the ground of scientific simplicity and because it would avoid all national susceptibilities, was rejected as involving insuperable difficulties, not the least of which would be the necessary recoinage of all the gold in circulation throughout the world. On the other hand, in considering the possible co-ordination of existing types, the national type of France had in its favor the consideration that the amount of the gold coinage represented by it, and in actual circulation in the states of the Latin Union, was hardly inferior, according to the best estimates obtainable at the time, to that of the entire gold coinage of all the other nations of the earth put together.

This consideration, with the additional one that the franc is nearly the fifth part of the dollar of the United States and the twenty-fifth part of a pound sterling of Great Britain, while Austria was at that very moment negotiating a monetary treaty with France for the assimilation of the coinage systems of the two countries by issuing pieces inscribed 10 *florins*, 25 *francs*, Roumania had actually adopted the French coinage, and Spain, Sweden, and Greece had given evidence of their readiness to do so, operated with such force upon the minds of the delegates as to bring them at length to the conclusion, with only one vote in the negative, to recommend to their respective governments that they should adopt, as the unit of the proposed international coinage, the weight in gold nine tenths fine of the existing gold piece of five francs.

To say that the recommendations of this conference were without influence upon subsequent legislation among the nations would be an error; altho it is quite certain that in regard to the principal end for which it was called together the conference proved a complete failure. Neither Austria nor Sweden fulfilled the promise held out by those governments in 1867 of adopting the proposed international unit; and in the United States, tho the effort to secure this result was pressed with great energy, ability, and persistence, the impression produced was so greatly disproportioned to the amount of zeal displayed as to overwhelm the advocates of the measure with discouragement.

But the secondary recommendation of the conference, favoring the single standard of gold and condemning the double

standard, did not prove equally fruitless. This was no doubt one of the causes, perhaps not the least weighty, inducing the government of the German Empire to abandon the silver standard which had prevailed in most of its constituent states previously to the union in 1870, and to adopt the gold standard in its stead. This was one of the reasons, but not the only one. Silver bullion was at the time at a premium in the double-standard nations, where the legal relation of value between the metals was as 1:15½; and gold was therefore in fact the standard in France and throughout the Latin Union, no less than in the gold-standard countries of Great Britain and Portugal. The statesmen of Germany, accordingly, very naturally desired to put themselves upon the common European basis. Tho the mint of France was open to the free coinage of both metals for all comers, yet silver had almost ceased to be offered for coinage; so that between 1856 and 1867 not a single full legal-tender coin of silver had been struck in that country. The small coinage, from two-franc pieces downward, had only been maintained in sufficient quantity for the ordinary petty traffic of every-day life, by the issue of a debased currency of limited amount and legal tender only in sums not exceeding fifty francs. In adopting, therefore, for the imperial coinage a system of gold monometallism, Germany was only conforming in her law to a state of things which actually at the time existed all around her in fact, and yielding to a tendency which seemed to be carrying all the great commercial nations in the same direction.

But it was a necessary consequence of this action of hers that she had no longer need of the large amount of silver in circulation among her people, which was supposed to amount to not less than \$400,000,000 in value. This, after 1871, she commenced calling in; and a portion of the old coin thus obtained she re-coined to serve as a subsidiary currency. The law regulating the coinage restricts this description of coin to an amount not exceeding ten marcs, or two and a half dollars, per head of the population; and thus there has been absorbed something over \$100,000,000 of the stock of demonetized silver. The remainder, as called in, has been offered by parcels for sale in the bullion markets of the world. A very large proportion remains still in circulation up to the present time, and about \$75,000,000

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are said to be now lying in the hands of the government. When this action of the German Government took place, several circumstances conspired to render the occasion unpropitious for so heavy a financial operation.

The populous empire of Russia (double standard) and that of Austro-Hungary (silver standard), having suspended specie payments, the first in 1857 and the second in 1868, were no longer purchasers of either metal; and Italy, a double-standard nation, which had suspended in 1866, was coining only the limited amount which her relations to the Latin Union permitted; and coining that not so much for use at home, as for circulation in the territory of those of her associates of the union as were still paying specie.

It happened also, inopportunately, at the same time, that the amount of the so-called "council-bills" drawn in London on India, from about £4,000,000 in 1867-8, had been annually and rapidly increasing, till in 1872-3 the total had reached the enormous sum of £14,000,000, or \$70,000,000. Thus the outflow of silver from Europe toward the great eastern dependency of the British Empire, with its practically unlimited capacity for the absorption of that metal, was for the time being checked or entirely arrested, and a market for the silver of Germany had to be found nearer home. Nor, if the theories of the advocates of the double standard are to be relied on, should there have been any difficulty in finding it. The demonetization of silver in Germany did not affect in any way the amount of the money metals of Europe; it involved only the necessity of a change of place of a portion of them. It is the special merit of the double standard, as the defenders of that system maintain, that it allows such change of place to occur without disturbance of the relations between the two metals. The double standard is in fact, according to them, the great equalizer which, like the governor of the steam-engine, makes the driving power, which is money, uniform in effect throughout all the vast machinery of the commercial world. Just in proportion as the silver of Germany was withdrawn from circulation it was necessary that the vacuum thus created should be filled up with gold. This demand of Germany for gold is spoken of by many as a fearful thing, threatening to create a monetary famine throughout the world.

The alarm is continually sounded that the world has not gold enough to provide for the money wants of all nations. But that is not the question in issue here at all. The question is only whether, so long as throughout the larger part of Europe silver continued to be the material of legal-tender money, while among more than half the populations of the Continent the double standard prevailed, we ought not to have had a beautiful example of the saving influence of this double-standard principle in the emergency presented. According to the estimates made by Mr. Ruggles in his supplementary report on the monetary conference of 1867, the states of the Latin Union alone had \$1,250,000,000 of coined gold in their possession; while the total amount of silver in all its denominations in circulation throughout Germany reached only about the sum of \$400,000,000. Certainly, if the principle of the double standard is worth anything, there ought to have been no perceptible impression produced upon the money market by allowing all the silver which Germany could possibly gather, and which has hardly exceeded the half presumed to be in circulation, to be bought with French gold and coined at the French mint. Even had there been German silver enough to displace all the French gold, nobody ought to have been concerned about the matter. On the other hand, according to one of the most thorough of the champions of the double standard, such an occurrence, had it taken place, ought rather to have been regarded with satisfaction if not with triumphant gratification.

"In the past history of the case," observes Mr. Weston, "the actual use of only one of the metals, arising from their market fluctuations, has been one of the most familiarly known occasional results of the double standard, and *has always been insisted on by its supporters as one of its capital recommendations*; because it insures the use of the more abundant and therefore *better* money, and tends to lessen the dearness of the dearer money by furnishing it to the markets of the world."¹ (The italics are ours.)

It seems to be a sad pity that the conference of the Latin Union, held as early as January, 1874, immediately after Ger-

¹ The Silver Question. By Geo. M. Weston. New York, 1878. (p. 87.)

many began to move in this matter, failed so completely to "insist" on this "capital recommendation" of the system which it was the business of the union to maintain, that they resolved to limit the coinage of the "better money" for the year then commencing, and for all the associated states, to less than \$25,000,000; against which they charged at the same time \$10,000,000 already delivered from the mint on certificates of December, 1873, so that the actual amount allowed was only about \$15,000,000, and only a portion of this was actually coined. Similar limitations were imposed in each of the years successively following, until, just after the adjournment of the abortive International Monetary Conference of 1878, the mints were closed against the coinage of legal-tender silver entirely. The Latin Union, instead of giving a hospitable welcome to the rich flood streaming over her boundaries from Germany, threw up dikes to shut it out and keep it back.

Now it is worthy of note that when they thus resolved to repel the fertilizing streams of German silver from their territory, it was not in the least necessary that they should buy this silver with their own gold. They might have let Germany find her gold where she could. All that France had to do was to keep her mint open, and to allow the holders of the silver, whoever they might be, to bring it there for coinage into pieces of five francs. New blood would thus have been infused into all the veins of French industry; and if there is any truth in the theory that the more a people have of money the better they are off, France, instead of finding herself in 1881 in a monetary strait-jacket, and having half her legal-tender coin depreciated to a point at which it is totally unavailable for use except in petty transactions of retail traffic, might have been to-day the happiest nation on the face of the earth.

The double standard was therefore killed in the house of its friends, in what ought to have been, if there is any true philosophy at the bottom of its theory, the very hour of its most signal triumph. Had not France and, following her example, the Scandinavian states and the Netherlands practically demonetized silver themselves, it is not conceivable that the act of Germany could have disturbed in any manner the monetary equilibrium in Europe. The amount of money would not have been in the

slightest degree affected by that act. There would have been an exchange between neighboring countries of the coin in circulation within their respective borders; nothing more.

Why then did France pursue a course so apparently, on her own theory, suicidal? Beyond any question she did it because she believes that, for a great commercial nation, gold is a more desirable material for coinage than silver. In this respect her opinion is shared by the great majority of the most intelligent people of other nationalities. There can be no doubt that this is the intelligent view of the subject taken in the United States.

During all the time that this movement was going on upon the other continent, it happened providentially that the people of the United States had no interest whatever in the turn the affair should take. For more than ten years not a single coin of any description, gold or silver or copper, had been in circulation throughout our entire territory. During all the eighty years up to 1873 which had passed since the establishment of the mint, we had coined but eight millions of silver dollars, or about \$100,000 a year; and for nearly forty of these years we coined no such dollars at all. Such silver dollars as had been coined had disappeared from circulation, their value as bullion having been greater than that for which they were receivable as coin, and consequently, in the statute adopted in 1873 reorganizing the mint, provision for the further coinage of the silver dollar was very judiciously omitted; and the revised statutes with equal propriety provided, in the year following, that this piece should be coined no more. This was simply recognizing in law a state of things which had existed in fact for about half a century. If ever since the world began there was offered to a nation a more fitting opportunity for illustrating the wisdom of the maxim to let well enough alone, the opportunity was in that crisis ours. The occasion was nevertheless seized by politicians for throwing the country into an excitement almost without a parallel, by charging the disastrous fall in the price of silver in the London market as a consequence of the coinage act of 1873; and charging further that the provision of that act in regard to the silver dollar had been procured by secret and artful practices of the moneyed men in Wall Street and Lombard Street for their own selfish purposes. It was even asserted,

and it has been constantly maintained down to this day, that the Congress which passed the act and the President who signed it did not know what it contained—a signal example, if true, of the carelessness with which legislation often goes on in Washington; but in this case the more wonderful from the fact that the bill was under discussion in two successive congresses, was printed in both newspaper and pamphlet form and widely circulated, and that its provisions were familiar in all their details, for months before its final passage, to most of the more intelligent among the people who interest themselves in such things. For an entire quarter of a century before this enactment the coinage of silver dollars at our mint had not amounted to six millions of dollars in all. This fact alone suffices to show the absurdity of the assertion that the stoppage of such coinage, under the operation of the act in question, could have in any manner influenced the price of that metal. Moreover, this legislation, so far from having been brought about by dishonest influences exercised by interested men, was due to the advice of the finance officers of the government itself; for the very sufficient reason that, as prices then stood, silver bullion uncoined was worth about three per cent more than the same metal coined into dollars; so that all the dollars issued from the mint were immediately exported, or melted up and converted into bullion again.

It has been said already that the act of 1873 demonetizing silver was an act which simply recognized in law a state of things which had already existed in fact in our country for about forty years. In this respect our experience and our history were but a repetition of those of Great Britain in 1816 and earlier; for in the year named England had been practically a gold-standard country for the whole preceding century. The entire monetary history of that country indeed, from the period of the first introduction of gold into the coinage under Henry III., has been one long-continued illustration and demonstration of the utter powerlessness of law to maintain in permanent circulation side by side both the precious metals as money at the same time. The very first experiment of this kind resulted in a failure so complete and absolute that it was not repeated for nearly a century. Gold coins seem indeed to have been struck in Britain as early

as the time of the Romans, and also later under the Saxon and Danish kings; but these with all other traces of that primitive rule disappeared on the advent of the Conqueror. In the letter on the coinage of Great Britain addressed by Lord Liverpool in 1805 to his Majesty King George III. there is presented a very lucid and interesting history of the vicissitudes to which the monetary system of the kingdom has been subjected, and of the chaotic condition into which it has been repeatedly thrown, by governmental tampering with the currency.¹ For almost three hundred years after the Conquest the only coinage in circulation in England was of silver; and the only form of silver coin struck was the penny, of the weight of $22\frac{1}{2}$ grains, making it a little heavier than the present half-dime piece. This penny was deeply marked by a cross dividing it into four equal parts; and for smaller payments it was customary to break it through these divisions into halfpennies, and quarters or fourths—whence the modern farthing. The first gold coin struck after the Conquest was issued by Henry III. in 1257, and was also called a penny. It had twice the weight and twenty times the nominal value of the silver penny, from which it appears that gold was then rated to silver as ten to one. Gold seems at this time to have been very cheap in England, and the people by common consent refused to receive the gold penny. Lord Liverpool says that the citizens of London made representations against this coin, and the king found himself obliged by proclamation to deprive it of its legal-tender character. It was of course soon driven out of use. A like fate, and for the same reason, befell the coin of the same metal issued about a century later by Edward III., in 1345, called a *florence* or *florin*. This coin, like the former, proved unacceptable to the people; and, after having been at first made by proclamation optionally receivable, was within a few months after its issue withdrawn from circulation.

This monarch, however, succeeded at length in the establishing gold as a part of the coinage; but such was the instability of the ratio between the nominal values of the two metals that the legal ratio during his own and subsequent reigns was subject

¹ A Treatise on the Coins of the Realm, in a Letter to the King. By Charles, Earl of Liverpool. Oxford 1805.

to continual changes. He himself first fixed this ratio at $1:12\frac{3}{4}$ nearly; but this he afterwards altered to $1:11\frac{1}{2}$, and in the course of the ten years following he made two additional changes. Neither of these was great, but experience has shown that only a very slight discrepancy between the legal and commercial ratio is necessary to produce an active traffic in the coins and a rapid disappearance of one metal or the other. As illustrations of this some examples reported by Sir Isaac Newton in 1717 are instructive. He states that in the reign of William III. louis d'ors of France were current in England at 17s. 6d., when they were actually worth but 17s. $\frac{3}{4}$ d.; and that when by a royal proclamation it was ordered that these coins should be received for only 17s., they immediately disappeared. The profit made by their importation was over two per cent, which was of course a considerable temptation; but that on their exportation was only $\frac{3}{8}$ of one per cent; yet they disappeared. At another time moidores of Portugal passed in England for 28 shillings, being worth only 27s. 7d. Being reduced by proclamation to 27s. 6d., they also disappeared. The profit this time on importation was one and a half per cent; on exportation only one third of one per cent. So that a change apparently insignificant in the legal ratio between the metals often serves to drive one or the other out of circulation altogether.

The struggle to maintain both metals in the coinage was continued from the time of Henry III. down to the accession of George I. early in the eighteenth century—that is to say, for more than five hundred years; but at this last-named epoch it was definitely abandoned, and silver has since ceased to be used in England except for petty retail traffic.

During the reigns of James I. and Charles I. this struggle was very energetic. It ceased temporarily to occupy attention under stress of more urgent affairs, during the great rebellion and the Commonwealth. But after the Restoration, and down to the accession of William of Orange, it went on actively, one metal or the other disappearing from circulation after every fresh effort to prevent this annoying result. The two monarchs named above, in addition to employing the natural means of accomplishing their object, which consists of course in endeavoring to conform the legal ratio of values accurately to the com-

mercial ratio, invoked the terrors of the penal law and exercised all the powers of the High Court of Star Chamber to deter men from the grave misdemeanor of melting down the coin or carrying it out of the kingdom.

After the Restoration, the rise of the value of gold continuing, Charles II., in coining a new 20 shilling piece under the name of the *guinea*, reduced its weight below that of the piece of similar nominal value issued by James I., and which he had called a *laurel*; but the reduction was not sufficient to put it into proper adjustment with the silver coins in circulation, and hence the kingdom was again menaced with a loss of its gold as complete as had occurred in the beginning of the reign of the last-named monarch. But here, by a common consent among the people, an expedient was adopted by which this misfortune was prevented, or at least mitigated. This was to receive and pay the guinea not at its mint value, but at its value relatively to silver (which was always the practical standard) in the bullion market. The guinea therefore passed for 21 or 22 shillings, and it is stated by Locke that "the gold coins varied in their values according to the current rates." This practice seems not to have pleased the government, for Lord Liverpool says there is an order on the council-books for enforcing the currency of the guinea at 20 shillings; but he adds that it was never issued, and that if it had been, it would have driven all the guineas out of the country.

During the successive reigns of Charles II. and his brother the silver coin of England became greatly depreciated by clipping and abrasion; and at the accession of William of Orange it was found, by a careful examination of the exchequer, that they had lost on an average nearly half their weight. A report of Mr. Lowndes, secretary of the treasury in 1695, states that this condition of the coin (silver being the general standard of value) occasioned "great contentions among the king's subjects in fairs, markets, and shops, to the disturbance of the public peace;" that it embarrassed bargains and greatly diminished trade; "that persons before they concluded any bargain were necessitated first to settle the price or value of the very money they were to receive for their goods, and that they set a price upon their goods accordingly;" also "that these practices had

been one great cause of the raising of the price not only of all merchandises, but of every article necessary to the sustenance of the common people, to their great grievance." He further states that the guinea, in consequence of the deplorable condition of the silver coin, had risen so as to be current for 30 shillings, which was "much higher than the state of the bullion market would justify;" and that consequently "silver bullion, instead of being brought to the mint, was exported to be sold abroad for gold, in which foreigners made their payments, to the great detriment of the merchants and manufacturers of England." In this embarrassing state of things the government sought the advice of eminent men of science, among them Sir Isaac Newton, who was made warden of the mint, and under whose supervision the silver coinage was thoroughly reformed. Before this was accomplished the guinea was, by successive orders, reduced in current value first to 26 shillings, above which it was not lawful to pay or to receive it, and afterwards to 22 shillings, at which nominal value it remained till 1717, when it was reduced to 21, at which point it remained permanently fixed.

After the completion of the recoinage, it was supposed, or at least hoped, that the price of silver bullion in the market would fall to the mint price; but the guinea continuing to be over-rated in popular esteem, it did not do so, and consequently silver coin began to be exported for the purchase of gold bullion abroad, as silver bullion had been before the recoinage. Hence, in 1717, Sir Isaac Newton said that "if silver money should become a little scarcer, people would in a little time refuse to make payments in silver without a premium." He showed that the real value of the guinea in silver was only 20s. 8d., while it was passing current at 21s. 6d., and he recommended that its legal-tender currency should be reduced to 21 shillings, which was done, the other gold coins being reduced in proportion. But as this reduction was not sufficient, silver continued to be exported, and silver soon ceased to be the practical standard of value in England. From that time, consequently, except for petty traffic, it has ceased to be in circulation in England altogether; or, in the words of Lord Liverpool, "from this period all considerable payments have been made in the gold coin; and the silver coins have generally served in making small

payments, or in exchange for the fractional parts of gold coins. Previous to this proclamation (fixing the guinea at 21 shillings) the people were disposed to make their payments in the gold coins in preference to those of silver. This last measure tended to confirm what was before the disposition of the people, and gave to the gold coins a complete ascendancy in the currency of the kingdom; and the silver coins have since become a mere representation of the gold coins, for the purposes before stated. The greatest part of the good and weighty silver coins which then remained have since been melted down and exported." He adds that from 1717 to the end of the eighteenth century, a period of eighty-three years, not so much as £600,000, equal to \$3,000,000, in silver had been coined in England; and that in the last forty years of the century less than £64,000, equal to \$320,000, had been coined; that is, only £1600, equal to \$8000 per annum. The legal ratio of value between the metals fixed by this last royal determination was $1:15\frac{2859}{13640}$; and the entire rise in the value of gold from the time of Henry III. was $47\frac{6511}{21420}$ per cent. Of this $32\frac{56}{7}$ occurred within sixty years after the accession of James I.

It was therefore not, as is commonly said, by the act of Parliament of 56th George III., but by the proclamation of 3d George I. above mentioned, that the demonetization of silver in England was for all practical purposes accomplished; but this effect, which followed that proclamation by the simple operation of natural laws, was confirmed by statute law fifty-seven years later, when, by act of Parliament of 1774, it was declared "that no tender in payment of money made in the silver coin of this realm of any sum exceeding the sum of £25 at any one time shall be reputed in law or allowed to be legal tender within Great Britain and Ireland."

But tho this statute demonetized silver as early as the year 1774 by destroying its legal-tender character except for a limited amount, it did not reduce that coinage to a purely subsidiary position. That was the special effect which the act of 56th George III., in 1816, did accomplish by reducing the weight of the shilling from $\frac{1}{8}$ to $\frac{1}{16}$ of a pound of standard silver, and limiting the legal tender to sums not exceeding 40

shillings. Great Britain has therefore been a gold-standard nation for nearly two centuries, instead of less than one as is commonly stated. She became so in consequence of an ineffectual struggle of several centuries to maintain the double standard; during the greater part of which time silver was her actual standard and her preference.

Our own briefer history is entirely similar. Having established our coinage in 1792 upon the ratio, supposed at the time to be the commercial ratio, of 1 : 15, our gold coins disappeared as fast as they were issued from the mint, and in fact the coinage of gold was very small. On the other hand, the facilities of the mint were not sufficient to supply the demand for coins of the cheaper metal, and we were flooded with Spanish silver for nearly forty years. We too, in 1834 made a readjustment of the relation between the metals, as England had done before us so often; but our experience was precisely that of King James: we made the change too great, and our silver disappeared as rapidly as our gold had done before. We submitted to this, and in 1853 provided against the loss of all our small money by reducing the fractional silver to the condition of a subsidiary overrated token currency of limited legal-tender character, precisely as England had done in her law of 1816. And the act of 1873 discontinuing the coinage of the silver dollar was, like the last-mentioned act of the British Parliament, simply a recognition of the existing condition of things.

Such being the case, the fact that we should have allowed ourselves, in a season of universal tranquillity and contentment, to be suddenly embroiled in an affair in which the consequences of our meddling could only be certain harm to ourselves and probable harm to others, admits of no explanation except on the supposition of one of those accesses of popular delusion and folly of which so many have marked the history of mankind. The harm to ourselves was certain; since, had the plan originally proposed of throwing our mint freely open to all comers been carried out, the refuse silver of Germany, and not only that but the silver coin of the Latin Union, Holland, Denmark, Sweden, and Norway, would have poured in upon us all together, and gold would have disappeared from our land at once and

forever. That disaster was momentarily averted, but its coming was only postponed; for the operation of the law actually enacted is bringing it nearer to us every day.

The harm to others also was more than probable, since the advocates of the double standard in Europe saw very clearly that to open the American mint to silver was likely to drive European governments generally into adopting in law, as they have already done in fact, the single gold standard. The ablest and most sagacious of all these economists, Mr. Henri Cernuschi, has been unceasing in his protests against this supreme of follies on our part; and he took the trouble to come all the way to this country in 1876 to make his protest before the Congressional silver committee of that year. Of that committee Mr. Richard P. Bland of Missouri was a member, and the response to the protest was the introduction into the House of Representatives of the notorious Bland Bill.

But even supposing there had been wisdom in a movement in this matter on our part, the form in which our movement was made was unwise to the last degree. It was insisted that we should coin once more the dollar of $412\frac{1}{2}$ grains, sentimentally called the "dollar of the fathers of the republic." But to do this requires the preservation of the ratio to gold of 1:16, while the leading European states are agreed on a ratio of 1:15 $\frac{1}{2}$. The inevitable consequence must be that, in case the free coinage of silver is recommenced in foreign mints—the thing which our bimetallist friends profess to hope for and desire—our entire legal-tender silver will be exported and melted up for recoinage abroad. This is not a result which depends in any manner upon the price of silver. Whether silver is dear or cheap, it will pay a profit of $3\frac{1}{8}$ per cent to melt up dollars and coin them into pieces of five francs. We have coined between eighty and ninety million silver dollars since the passage of the Allison Bill of February, 1878, and our only security for the permanent existence of a single one of these coins lies in the possibility that the Latin Union may refuse to coin silver any more. For the hope that they will adopt our ratio of 1:16 has not a shadow of foundation. They expect to drive us to the adoption of theirs; which we cannot do without equally condemning our \$80,000,000 already coined to the melting-pot.

Thus the inconsiderate rashness with which the forty-fifth Congress rushed into the coinage of the dollar of $412\frac{1}{2}$ grains has no parallel except in the blindness and folly which led to the coinage of the silver dollar at all.

Several special arguments are urged in defence of the re-monetization of silver in our country, to which in conclusion it is proper to give a moment's attention. It is said, first, that silver constitutes half the money of the world, and that to deprive it of its character as such would be an infinite wrong to mankind. Very well, then let it continue to be money. The question at present is not what is good for the world, but what is good for us here in the United States.

If silver is needed for the world's money, as it probably is, it will continue to be used where it is needed. Suppose that all nations should prefer gold, but that all cannot get gold; those who cannot will use such money as they can get. But all do not prefer gold by any means; and more than half the population of the globe do most decidedly prefer silver, and are likely to do so for centuries, if not for all time. Hindostan, Burmah, Siam, the Philippines, and the Chinese Empire not only employ silver for money, but they consume quantities of it for personal ornament and for other purposes of luxury. If the present low price of silver has been really caused, as is claimed, by the adoption of the gold standard in Germany and the cessation of silver coinage in the mints of the civilized world, it cannot be permanent; and it will be followed by a rise when the free flow to the East is re-established and the temporary glut of the London market is worked off. In the words of Mr. Bagehot,¹ "there is therefore, in the end, a certain market for the silver displaced from Europe; it will ultimately go, as the rest has gone, to the East, where it is the ancient and the best attainable paying medium." The price therefore must ultimately rise to the point determined by the cost of production. But if it has heretofore been sustained artificially above that cost, it will hardly return to the same level again, nor can the reopening to its coinage of all the mints in the world force it to do so.

But then it is claimed that the production of silver is a great

¹ The Depreciation of Silver. By Walter Bagehot. London, 1877. (p. 3.)

industry, and an industry peculiarly our own; also that our silver mines are a source of incalculable wealth: consequently, that to refuse to coin silver—that is, to buy it—is to discourage that industry and to check the development of our abundant natural resources. To this it may be replied, that any industry which cannot live unless it is supported by the state, had better, to the full extent to which that is true, be abandoned. Mines that will pay at the present prices of silver will continue to be worked; mines which will not, may be given up; but it does not follow that the productive energy which would otherwise have been spent on them will be lost to the country. It will only be turned to something more profitable. As a general principle of public economy it may be said that a state can commit no greater folly than to pay men for carrying on an industry which is so little needed that it will not pay for itself. There is nothing in the nature of gold or silver to make its production more worthy of encouragement than that of hemp or hay, or rice or cotton. On the other hand, the powerful fascination exercised by the precious metals over the imaginations of men, has made the search for them one of the most demoralizing pursuits in which any people have ever been engaged. It has everywhere engendered a spirit of reckless adventure and blind trust in chance which has made the whole business little better than a gigantic system of gambling. And if in this grand game it occasionally happens that a great stake is won, it is too true on the other hand that more frequently the players lose all they possess. The amount of capital which has been hopelessly sunk and wasted in our country in ill-judged mining schemes within the last thirty years, according to recent statements published in leading mining journals of this city, reaches a total truly appalling. We are hence compelled to make a heavy deduction from the supposed contributions of these enterprises to the wealth of the country. For these reasons every statesman and every true economist will regard as of something more than doubtful expediency the policy of encouraging by positive legislative action the production of the precious metals as a national industry.

But it is further urged in favor of the rehabilitation of silver, that without a legally established ratio of value between this

metal and gold we have no basis for a par of exchange in international commerce with silver-standard nations. There would be something at least plausible in this if exchanges were usually made at par; but as that is not the case, the par of exchange is useful only as a point of reference, by means of which to state simply the actual rate. It is not in the least necessary to its usefulness that it should be a true par—it may for that matter be entirely arbitrary and false: all that is needed is that it should be fixed. We had a false par between ourselves and England for all the first half of the present century, but it answered its purpose. The par is like the zero of the thermometer—it may be fixed at freezing, as in the centigrade, or at the temperature of melting snow and salt, as in Fahrenheit; but the actual indications are equally accurate in either case. In the absence of law, common consent will soon fix on a mean point about which the fluctuations of the bullion market oscillate; and this will afford probably a better par than any that law could establish.

After what has been said, it is hardly necessary to state our own conviction, that any attempt to constrain a people, by royal decree, by legislative enactment, or by international treaty, to accept a system, political, social, or monetary, to which they are not borne by the natural course of events, and which does not approve itself to their general sense of fitness or need, must be a necessary failure. It is certain that the United States have become a single-standard nation by the force of circumstances; it is certain that a very decided majority of our people do not want the double standard, and do not approve its principle. It is next to certain that any arrangement entered into at Paris for the adoption of such a system, in establishing which the greatest of all the commercial nations shall decline to be a party, must prove a failure; and it is more than doubtful whether the concurrence of that nation, which is altogether improbable, could make it a success. Yet we are told that our delegates have departed on their mission "with light hearts," and in the full expectation of triumphantly solving the most knotty problem of the century.

The problem is incapable of solution by any means which the conference is likely to contemplate. For, first, the delegates appear to be practically under instructions to frame if possible

a convention fixing a definite ratio of values between gold and silver, which ratio the assenting nations are to accept and to employ in their coinage. The actual ratio in the market is at present 1 : 18 nearly. In defiance of this the European bimetallists propose to force the adoption of the French ratio 1 : 15½. Our delegates are expected to yield in this matter, tho our eighty millions of dollars have been coined at the ratio of 1 : 16. This decision, if it be what is expected, will either control the market or it will not. If it does, the holders of silver certificates in the United States will immediately draw their coin, melt it into bullion, and carry it to the mint to be coined over. If the whole is so recoinced, the owners will reap an apparent benefit of two million six hundred thousand dollars; compensated, however, by a probable corresponding fall in the purchasing power of money. In so far as the government is an owner, it will participate in this advantage, whatever it may be worth. But if the decision does not control the market the owners of gold coin will buy silver bullion for coinage, making a profit of a little over 16½ per cent so long as the present commercial rate continues. Under these circumstances of course gold will soon cease to form a part of our metallic currency.

But it will be said gold cannot be exported with profit because it will bring no more in a foreign market than in ours. This is hardly true. Unless the oriental peoples come into the agreement gold will soon begin to make its way in India, where it is doing so already under the peculiar financial relations of that country to England; and before many years are past the East will prove a more productive silver mine than the Comstock lode has ever been in its palmiest days. If all the oriental nations *could* be brought into the agreement a very sensible effect upon the market rate might very possibly be produced, for the coinage demand for silver would so far exceed any other possible demand for that metal as to raise its price; but even this could not overrule and control that more efficient cause which determines finally the price of all commodities, the cost of production. Stamped silver would by force of law be exchangeable for stamped gold, as stamped paper is now; but unstamped silver, like unstamped paper, would have to take its chances in the market. It would, moreover, soon be found that gold coin

would possess a greater purchasing power than silver—just as before resumption it had the same advantage over paper; and throughout the world there would be two kinds of money in circulation, legally equal in value, but practically unequal, to the great confusion of business and the great embarrassment of trade.

Moreover, in case England should not be a party to the arrangement, and even probably if she should be, gold would continue to be, as it is now, the real standard of the world; and all the great transactions of commerce would be made with reference to that standard. Furthermore, in the settlement of international balances gold would always be the metal preferred and employed, on account of its superior portability; so that it would steadily accumulate with creditor nations, and be withdrawn from debtor nations.

As the work which the conference have apparently been called together to do is to report in favor of universal bimetallism on the basis of the ratio 1 : 15½, there seems to be every probability that they will do this work and adjourn. But there is something much better which they might do, and in doing which they might much more effectually serve the interests of mankind. Let them recommend to the world to abandon the artificial distinctions of pounds sterling, dollars, francs, and marcs, and to restore the precious metals to the footing on which they stood when they began first to be used as money; viz., that of simple units of weight. Let our coins of either metal be stamped simply with the number of units of weight which they severally contain, and with the degree of their fineness; and let them find their relative values, as other commodities do, by free competition in the open market. Under these circumstances one metal or the other will be the practical standard of value, and prices will be quoted in reference to that. The other may be equally legal tender, but legal tender only at a relative value determined by the condition of the bullion market. This relation might even be made permanent for brief periods—say for a month or a year at a time—by circular notice issued by the Secretary of the Treasury with the advice of a syndicate of merchants, or of the chambers of commerce of the principal cities; but the relation would probably remain so nearly constant that

these announcements would rarely, and only at long intervals, be anything more than confirmations of the rates previously established.

Under such a system the standard metal would continue in the United States and England to be gold as at present. The probability is that the same standard would prevail throughout the Latin Union, Spain, Holland, Germany, and the Scandinavian states. But in all these silver would be equally a legal tender for the payment of debts; only that at present it would only be so at one eighteenth of the value of gold, and not at the present legal ratio of France or of our own country. If by this use of silver, which fully reinstates it in its function as a money metal, its price should rise, all the better. Then its legal-tender efficacy will rise also; and in case of a new and unexampled increase hereafter in the supply of the more precious metal, and an extraordinary diminution of that of the less precious, nothing could prevent the advance of its purchasing power to any extent. In Austria, Russia, Turkey, and all the East the standard metal would probably be silver, and gold would be rated as money relatively to that, varying occasionally in its legal-tender power, as we have supposed silver to do among the more western nations. But everywhere, east or west, both metals would be equally current as money.

A state of things like that here proposed did actually exist in Great Britain from the time of the Commonwealth down to the revolution. Silver was the standard of value; but the gold coins, tho issued at a fixed legal valuation in reference to silver, were nevertheless received and paid, as stated by Mr. Locke, "according to the current rate." No inconvenience was experienced from this practice. On the other hand, it was attended with the great advantage that it prevented the gold from being melted up and exported.

It is worth considering, moreover, that by adopting a series of simple units of weight as coins we shall not be compelled to depart to any inconvenient degree from our ordinary habits of thought in matters of money. Take, for example, as the basic unit one gram of gold nine tenths fine. The value of this in the money of the United States is six dimes less two mills; in that of Great Britain, one half-crown less one halfpenny; in

that of France, three francs ten centimes exactly; and in that of Germany, two and a half marcs plus one pfennig. A coin of ten grams, which would be a little heavier than our half-eagle, would be worth six dollars, or thirty-one francs, or twenty-five marcs, or twenty-five shillings less five pence, with scarcely a sensible error in either case. Such coins could easily be made use of as a part of the existing monetary systems of the leading commercial nations, and might in no very long time supersede them all.

One important advantage which would result from the use of coins like those here suggested would be that they would be instrumental in fixing in the minds of the people the idea of intrinsic value as an essential quality of money, and in eradicating the pernicious notion which seems to have become so popular, and which a no less distinguished man than Mr. Cernuschi has distinctly avowed, that "money is an artificial value created by law." It is to the prevalence of this mischievous delusion that most of the great flood of financial fallacies which have deluged the nations of the earth in modern times, leaving behind them only disaster and ruin, have been mainly owing.

The scheme here suggested is not unsupported by authorities entitled to respect. It was advocated as the basis of an international coinage by Michel Chevalier, the well-known and highly distinguished senator and public economist of France, more than ten years ago. It was proposed in substance for a similar purpose to the Seventh Statistical Congress, held at the Hague in 1869, by the eminent statistician Dr. Farr, delegate from Great Britain. It has been recommended in formal resolutions adopted by the American Metrological Society and by the American Social Science Association, and it has had the approval of many men of sound judgment and large experience in financial matters.

Its adoption by the nations would settle at once and forever the vexed silver question. And if it is true, as has been maintained, that the relation of value between the precious metals, when not disturbed by legislation prejudicial to either, is one of the most stable known to human affairs, this relation, in the free play of exchanges, will soon fix itself with an exactness which no arbitrary rule of statute law can possibly attain; and will re-

main at the point so determined, with oscillations practically insensible. If it could be counted on as among the reasonable possibilities that a proposition so judicious as this could be the outcome of the present council of the nations, the Third International Monetary Conference might have the honor of triumphantly accomplishing the object for which the first was called; viz., that of giving to the world a system of universal money, destined, by its simplicity and convenience, soon to supersede and obliterate the whole perplexing multitude of local and discordant systems now in existence; and in doing so might leave upon the page of history a record far more enviable than that which now probably awaits it, of having added one more to the innumerable fruitless struggles of the past for the attainment of the unattainable.

F. A. P. BARNARD.

ON CAUSATION AND DEVELOPMENT.

I AM not singular in holding that the whole subject of causation has become confused in the minds of educated men, including scientific men; and that the time has come for reconsidering it in the light which science now furnishes. In our day two or three doctrines have been elaborated which require us to revise (so I think) the statements made as to cause, more especially in its relation to force and energy. It is to be understood that throughout this paper I refer to causation objective, and not subjective; that is, to causation as it acts independent of our mind observing it (an ignited lucifer-match will kindle a rick of hay whether we notice it or not), and not to the special metaphysical question of ages, as to the origin and nature of our belief in the relation of cause and effect. It is further to be borne in mind that in the body of the article I speak exclusively of physical causation; that is, of the forces or activities of bodies; only towards the close showing that there may be mental or spiritual powers operating in our world quite as certainly as there are physical forces. It has been established that,

First, there is a duality or plurality in causation; that there are two or more bodies in all causal action of a physical nature. There were thinkers who had a glimpse of this doctrine from an old date. Aristotle spoke of *συναιτίον*, which Hamilton in noticing it translates concause.* But the truth was first clearly enunciated by Mr. J. S. Mill in his "Logic" (B. IV. c. v.) "The statement of the cause is incomplete unless in some shape or other we introduce all the conditions. A man takes mercury, goes out of doors and catches cold. We say perhaps that the cause of his taking cold was exposure to the air. It is clear,

* Sextus Pyrrh. iii. 15, speaks of *συνεντινά*, *συναιτία*, and *σύνεργα αἰτία*.

however, that his having taken mercury may have been a necessary condition of his catching cold; and tho it might consist with usage to say that the cause of his attack was exposure to the air, to be accurate we ought to say that the cause was exposure to the air while under the effect of mercury."

The doctrine had occurred to me before I read Mr. Mill's "Logic;" but as he published it first, I do not claim any credit in it. As approaching it, however, from a somewhat different direction, I believe I can make it more explicit and comprehensive. In all physical action there are two or more bodies, molecular or molar; at the present stage of science I ought to add that this body may be the ether in which the undulations of light take place. Now the cause—by which I mean that which invariably has produced the effect, and will invariably produce it—consists in the mutual action of two or more bodies; that is, their action on each other. Thus in the case adduced by Mr. Mill the true cause of the effect, the cold, was not the air alone or the body alone, but the air and the body under mercury. Without the concurrence, or rather the joint action, of the two, the effect would not have been produced. It is the same in all other cases. A ball at rest is struck by a ball in motion; the one ball is made to move, the other has its motion stayed. The cause consists of the two balls in a certain state, and the effect the balls in another state. A picture-frame falls from a wall and breaks a jar standing on a table below. We say that the frame, or rather the fall of the frame, was the cause of the fracture of the jar. But the true cause, that which forever will produce the same effect, is the frame falling with a certain momentum and the brittleness of the jar. Had the frame come down with less violence or the jar been stronger, there might have been no breakage. In most cases of action a considerable number, in some a vast number, and variety of agents combine to produce the result. Take the sprouting of a flower in spring: in the cause there are the increased heat and light of the sun, the state of the plant in the earth, and the state of the soil. Without the concurrence of all these the effect would not be produced.

Secondly, there is a duality or plurality in the effect. This is a further truth which Mr. Mill has not expounded, but which oc-

curred to me as I was thinking out the doctrine which Mr. Mill preceded me in unfolding. It follows from Mr. Mill's doctrine when it is properly understood, and seems to me to be quite as certain and fully more important and of wider range in its applications. Thus in Mr. Mill's illustration the cause was the state of the atmosphere, and the body as affected by mercury; the effect was the same atmosphere insensibly changed in temperature, and the body under a cold. In the second case the true cause consisted of the two balls, one in motion striking the other at rest; the effect (which would be forever produced by the same cause) the ball which was at rest moving and the ball which was in motion at rest. In the third case the cause was the picture-frame with a certain momentum striking a jar of a certain structure; the effect was the frame losing part of its momentum and the jar broken. In the case of the plant germinating there must have been in the effect changes—it may be incapable of measurement—in all the agents acting as the causes in the sun's heat and light absorbed in the earth and in the plant sprouting.

Taking these views with us, it may be of great use to have appropriate and definite phrases to express them. The word Cause, that which invariably produces the effect, should be reserved for the combination of agencies producing the result. The cause of the man's taking cold is not merely the cold atmosphere or his frame being affected by mercury, but in the two acting on each other. The word Effect should in like manner be applied to the combined result, and comprises the change in the air as well as the colded affection of the body. In the other illustrative cases it implies the movement of the one ball and the staying of the other; the loss of momentum in the picture-frame as well as the breaking of the jar; and the change in the rays of heat and light coming from the sun as well as the germinating of the plant.

As causes are dual or plural, it is proper to have phrases to express the parts. The law is often stated that the same cause always produces the same effect in the same circumstances. But in order to clearness and accuracy it is essential to specify what are the circumstances; it is in fact necessary to put them into the cause, as without them the effect would not follow. In order to the germinating of the flower there is not only the state of the plant

and soil, but the additional heat of the sun. All the acting parts may be called agents or agencies, without specifying what they are. They are bodies in a certain state acting on other bodies.

Very often one of these agents is more important in itself, or in our estimation, or for our present purpose, than the others; this is designated pre-eminently the cause, and little or no evil may arise from this provided always that it be understood that this agent needs one or more co-operating agents which are parts of the full cause. If it be said that the cold air was the cause of the man being colded, it was because his body was disposed towards such an issue by mercury. It is not easy, or perhaps even possible, to lay down a rule as to which of the agents should be called the special, the main, or the prominent cause, for the cause consists in the mutual action of the whole. When man is working he often calls in one agent to produce an intended effect. If he wishes to kindle a heap of straw, the agent he attends to is the fire he applies; if he wishes a good crop from his ground, he looks to the manure; if he wishes to be cured of a disease, he selects his medicine: tho in all such cases there is need of co-operation in the state of the straw, or of the ground, or of his bodily frame. In nature there is often one agent that is particularly potent. When a tree is struck by lightning it is the electricity that is specially noticed, tho the structure of the tree had also to do with the effect produced.

Fixing on the agent that is most prominent in itself or in our eyes as the cause or special force then co-operating, that agent may be called the *Occasion*. This phrase is specially applied to circumstances which cast up to call forth a power into exercise or to work with causes steadily operating. Thus that ill-constructed house fell on the occasion of a storm arising. I was prompted to write a letter to a friend by my affection; but the occasion was his suffering a severe loss; the two actually called forth the letter. Malebranche was the philosopher who brought the phrase "occasional cause" into general use. He represented the will of God as the true cause of all creative action, but the volition of man might be the occasion of the forthputting of the Divine Power. Thus when I move my arm the true cause is the Divine Will, but my purpose is the occasional cause. In

such a case we may allowably give a prominence to the Divine Power, but it should be noticed that while one of the agents is the important one, the other or others, the action of the brain and nerves, are necessary to the production of the precise consequence, which will not follow without the co-operation.

We are thus enabled to give a philosophical explanation of what is meant, or rather what should be meant, by *Condition*, a phrase so often used vaguely and illegitimately in the present day in its application to physical operation. In order to be rid of an agent or to drive it into a corner they say it is simply a condition. In order to the production of a given effect a certain agent is fixed on as producing an end, the other or others are represented as simply conditions. As proving design we show that animals with a stomach for digesting flesh have also claws and strong muscles to catch and hold their prey. But an attempt is made to do away with the force of the argument by urging that these adjuncts are merely the conditions of the machine working. But properly understood the argument lies in the circumstance that the co-operating conditions have met. The presence of strings in a harp is a condition of it producing music, but the evidence of design is in the presence and combination of the necessary strings.

We may legitimately and conveniently use such phrases provided we understand them ourselves and let our readers or hearers understand what we mean by them. But it should be distinctly explained that all the agents acting, whether circumstances, occasions, or conditions, constitute the cause without which the effect would not follow.

It is needful to make like explanations and come to the same understanding as to the Effect. In all cases of physical action the effect is also dual or plural; it consists of two or more agents changed—I hope to show the same agents as are in the cause. These constitute what has been, and what will always be, produced by the cause. But it often happens that a special end is contemplated when we set an agent or agencies aworking; and when this is effected it is regarded as the proper or the only effect. But there may be other consequences which we did not consider or look for, or which we regard as minor or irrelevant ones. We wish for a shower to refresh the ground; as it falls it

accomplishes that end, but it may also so swell a stream that it works destruction as it overflows its banks. A new machine is invented which produces a greater amount of work, but it throws a number of people, who followed the old methods, out of employment. It is desirable to have a phrase to denote these secondary effects, as they are regarded; and they may be described as *Concomitants*, or more expressly as *Incidents* or *Incidentals*. Perhaps some would call them Accidents, and they may be so called as they were not intended, as when one fires an overcharged gun and is wounded by its striking backward. But these accidents are quite as much caused by the agents as the others that were expected. In all cases the effect properly understood consists of the whole of the agents that have been acting put in a new state. Any one who sets new agencies agoing, say starting a new trade or passing a new law, is bound to look not merely to one but all the consequences that must follow.

Thirdly, there is the grand doctrine established in our day of the Conservation of Energy. It has long been known and acknowledged that the sum of matter in the cosmos is always one and the same. We burn a piece of paper and it disappears from our view, but is not annihilated; one portion of the matter has gone down in ashes, the other has gone up in smoke, and if we could bring the scattered particles together they would constitute the original paper. It has been established in our day that the same is true of the energy in matter. This doctrine was anticipated by Leibnitz and established in our day by Meyer, by Joule, Grove, and others. According to this doctrine the sum of energy, actual and potential, in exercise or ready to be exercised, is always one and the same. It cannot be increased and it cannot be diminished by any human, indeed by any mundane, agency. When any portion of it leaves one body it enters into another. The sum of energy in the two balls have in them the same amount of energy before they strike and after they strike. When the energy disappears in one form, say in mechanical force moving a mass, it appears in another, say in heat, which is molecular motion. But the sum is always one and the same.

It is an integrant part of this doctrine that the physical forces are all correlated, a truth which has been beautifully ex-

pounded by Grove. The energy may take various forms, say the purely mechanical, the chemical, the electric, the magnetic. These forms are capable of being transmitted into each other, and this in definite quantity, so much mechanical force into so much chemical force, which chemical force may be reconverted into the mechanical. This shows the whole physical forces of our cosmos to be correlated and capable of being transmitted into one another; the sum always remaining the same.

It may be difficult to point out the full relation between these three doctrines which I hold to be severally established. But there is no inconsistency between them. Perhaps the full doctrine may be so stated as to embrace all the three and make them aspects of one grand truth. Our cosmos may, as the Pythagoreans supposed, be like a closed globe with an immensely large but definite number of bodies in it. Each of these bodies possesses a certain measure of physical force or forces. These act and react upon each other, producing all the activity, all the movement, in our world. The bodies act on each other, forming a cause. In doing so they modify each other, and the result is the effect. Meanwhile the sum of matter and the sum of the forces in the bodies continue one and the same, and both are incapable of increase or diminution. This is at least an intelligible enough doctrine, and embraces the three truths which have been separately stated, and seems in perfect consistency with all that has been established in regard both to the persistence of matter and the persistence of energy, as Herbert Spencer calls it.

Meanwhile the conservation of energy may be regarded as an established doctrine. Savans do indeed continue to assert that some of the most eminent among themselves do not understand it, or have not expressed it properly, or have illegitimately applied it. But it is universally admitted that the doctrine is a true and an all-important one.

But let us properly understand and explain it and keep it within its proper limits. It will be admitted by all at once that we are not entitled to affirm that the law extends beyond our cosmos or knowable universe. For anything we know there may be other worlds beyond our world, and we have no right to say that in these worlds there is only a definite amount of energy which cannot be increased or diminished. God may, or

may not, be creating suns or earths or living beings beyond our ken and altogether beyond our science. The doctrine of the conservation of energy, as I understand, holds only on the supposition that our cosmos is like a closed globe. It is conceivable that our world may not be so closed in; that the dissipated heat which is passing into space may travel into other worlds and influence them without our being able to notice it.

This restriction of the doctrine is so obvious that it is scarcely worth noticing it. But there are other limitations which it is of vast moment to bring into prominence, as they are being overlooked by some of our scientific men. There is clear evidence that there are other potences or powers in nature besides the mechanical or physical forces. It is not proven that the doctrine of the conservation of energy applies to these.

Take Life. So far as I understand him, Herbert Spencer seems inclined to hold that the doctrine applies to all the powers in the world, even to the vital and mental; indeed, he seems incapable of distinguishing between nerve force and mental force. But he brings no proof that physical force and psychical force can be transmuted into each other. The language of most of our scientific speculators is hesitating. Huxley and Tyndall resolutely maintain that there is no proof that living beings can proceed from non-living. Darwin calls in three or four live germs, which he ascribes to God, before he can account for the development of vegetable and animal life. I have observed that those who reject a separate life or vital force are obliged to bring it in under another form. Thus Darwin calls in a pangenesis pervading organic nature, and Spencer has physiological units which play an important part in generation and heredity, and these are certainly vital forces. Then the arguments and experiments of Beale have to be met, and they have not yet been met by those who would deny the existence of a vital potency of some kind different from mechanical force.

But there are other agents in our world more clearly distinguished from the physical forces than the vital powers are. I refer to the psychical or mental; to those of which we are conscious, which in fact we know immediately; such as our sense perceptions, our memories, our judgments, our reasonings, our desires, our emotions, our resolves. These we know as directly

and clearly as we know the affections of body, such as extension and resistance, and we have quite as good evidence of the existence of the one as of the other. Are these mental powers to be included in the physical forces which can neither be increased nor diminished? Can the physical forces be transmuted into the mental, say mechanical, or the chemical into thoughts, inclinations, and volitions? Nearly every scientific man in the present day admits, nay, maintains, that there is no proof of this. Many affirm that they cannot even conceive it to be so. Tyndall, no doubt, in his Belfast address hastened on to a high vaporous generalization, and declared that it looked as if all things could be brought under the potency of matter; in the mean time declaring, however, that he could not conceive how matter could produce mind, or mind matter. Mr. Fiske talks of our now needing to assume only one universal assumption, "the principle of continuity, the uniformity of nature, the persistence of force, or the law of causation;" but then he is obliged to add that "in no scientific sense is thought the product of molecular movement, and that the progress of modern discovery (correlation), so far from bridging over the chasm between mind and matter, tends rather to exhibit the distinction between them as absolute." The contradiction is here evident, and has been pointed out by scientific men; but I need not dwell upon it, my object being simply to show that thoughts and mental affections have not yet been reduced to physical forces. No doubt mind and body do so far affect each other. If a person is told that his dearest friend has died suddenly, his pulse will be apt to rise. Prof. Barker attaches a great importance to an experiment of a person first reading easy English, when his pulse was not affected, then reading Greek, when it rose several degrees. Such cases, and they might be multiplied indefinitely, show that mental thoughts and feelings do affect the brain-action, but they do not show that they add to or diminish the physical forces in the brain, or that the mental feeling or thought has been transmuted into a movement of the pulse. A man standing by a stream pushes a big stone in the water aside and the stream flows a little more rapidly for a minute or two; but he has not thereby added to the quantity of water. Just as little does mental

action, reasoning or feeling, add to or diminish the amount of physical force in the cerebro-spinal mass.

There is no evidence, but the very opposite, that our mental actions are identical or correlative with bodily motions or activities of any kind. Take as example, the discoveries of science, the reasonings of mathematicians, the visions of poets, the penetration of such philosophers as Aristotle, the ardor of the patriot, the beatific vision of the Christian, the sacrifices made by the poor for honor and honesty's sake. What savant will estimate for us in quantitative expressions of physics or chemistry the depth of affection in the mother's bosom when she incurs death herself to save her son, or the height of genius reached by Shakespeare when he conceived Hamlet or Lady Macbeth? There is no one proper quality of matter, such as the occupation of space, or resistance, or elasticity, that can be predicated of thoughts or affections. There is no one quality of mind, such as perception, thought, reasoning, or love, that can be applied to this table or that chair. The instrument has not yet been invented that can weigh or measure our intellectual or voluntary operations. When a tree dies it carries into the ground not only the particles of matter which composed it, but the forces in the tree to add to the forces in the ground. It is the same with the body of brute or of man when it is buried, it carries with it into the grave all the physical forces; but were there any new physical forces added to the earth when Plato, Milton, Bacon, or Newton died?

It thus appears that in the very midst of the physical forces and their correlations there may be other operations, mental or spiritual, and against this science has and can have nothing to say. I mean to refer to these farther on in the article. Meanwhile let us look at the physical forces acting according to the principles laid down.

1. Without attempting to explain their exact nature, or to enumerate them, let us designate the physical agencies operating in our world by the letters of the alphabet and inquire how they act. A ball at rest is struck by a ball in motion. Let us call the ball at rest A, and the ball in motion B. The two constitute the cause, which is

The cause A B.

As they act the effect follows: A moves while B's motion is stayed, and as the effect we have bodies changed,

The effect A' B'.

But in its motion A strikes C, and B is struck by D, and we have

Two causes A'C and B'D,

and the

Double effect A³C' and B³D'.

But these agents come to act on other agents, E, F, G, H, and we have a

Complex result, A³E, C²F, B³G, D²H.

On the supposition that these agencies are in a closed ball and act on each other and on nothing else, the sum of energy would be one and the same, while each body might be gaining or losing energy, one or both.

In the first action of A B, A gains energy from B and moves, while B loses what energy it gives and is stayed. But A going through the air and over a surface loses the energy it gained, imparting it to the air and surface, and comes to rest; and B is struck by D and gets the energy it has lost and moves. There is thus a continual action kept up among the bodies. The energy in each body varies, it may be from moment to moment, but the amount among all the bodies continues the same.

2. We see that the effects come to act as causes. Thus if we represent the cause as A B and the effect as A'B', we see that each of the agencies A and B is ready to act always when combined with some other agency, such as C and D. These last acting as causes become effects which may again become causes in combination with other or the same things. The conservation of energy thus keeps the world the same through ages, while these constant changes give it its activity: the one as it were constituting an unchanging ocean, the other the tides that agitate it. It is thus, as the Eleatics held, that everything is fixed and immutable, but equally true, as Heraclitus and the *φιλοσοφοι ρεοντες* taught, that everything is becoming.

3. We see that in physical nature (and I speak of no other) the effect consists of the agencies which have been the causes appearing in a new form. When the cause is A B, the effect is A'B'. When the cause is more complex, A, B, C, D, E, F, G, H, all of these agencies are changed or modified; and these as

changed constitute the effect that will forever follow the cause. This makes all physical causation a kind of evolution or development, a favorite doctrine with certain theosophists who derived all mundane things from other mundane things, and all things from God. This doctrine was apprehended and expressed in a mystical way, but contains an important truth which can be separated from the error with which it was associated and put in a scientific form. It is not that the effect emanates from the cause; but the effect consists in the agencies constituting the cause being put in a new state.

4. It is altogether wrong to represent with Hume the relation of cause and effect as being merely or essentially invariable antecedence and consequence. It is something deeper in the very nature of things. The effect which is always dual or plural consists of the things that constituted the cause in a new condition. There is and always must be invariable and unconditional antecedence and consequence, but prior to this and producing this there is the conservation or persistence of force which comes out from the agents acting as the causes, goes into the effect, and thus necessitates antecedence and consequence.

5. We see what is the inertia of body. Newton's First Law of Motion follows from the principles we have laid down. A body at rest will continue at rest forever unless it is acted on by some other body; a body in motion will continue in motion in the same straight line unless stayed or deflected by some other body. All this is a corollary from the principle that causal action is the action of two bodies, and that a body will not act unless acted on by some other body.

6. We see the nature of the law of action and reaction. A body will not act unless there is some other body acting on it. Under this view matter is passive. It acts only so far as it is acted on. In another sense it is active. One body acts on another body; thus two bodies are A and B, and A and B are both changed. A at rest moves and B is stayed. What B loses in being stayed, A gains and moves. This gives us Newton's Third Law of Motion, that Action is always equal to and the opposite of Reaction. B gives what it loses to A, but the sum of energy of the two is the same after action as before action. It follows that the energy given to A is equal to that lost by B.

7. It is sometimes stated that the same effect may be produced by different causes. This is not true or it is true according as we understand it. A jar may be broken by a picture falling on it, but it may also be broken by a stone flung at it. The breaking of the jar may thus be produced by two different processes. But in both cases the breaking of the jar is only part of the effect. The full effect in the one case was the jar broken and the picture stayed; in the other, the jar broken with the stone stayed.

8. It is often said that great effects follow from small causes. A cow kicks a kerosene-lamp, and first the shed is ignited and then the half of a great city is burned. The British Government denies Colonial America a comparatively small claim; and a revolution breaks forth which separates Great Britain and the United States forever. But it is not quite correct, it is not the full truth, to say that one cause did all this. In all such cases there is a co-operation and succession of various causes. The fire is carried on by there being all around inflammable materials to propagate it, and the separation of the countries was really produced by a widespread discontent. In like manner a mighty agency may often issue in a very insignificant effect, because there are no conspiring powers.

Finally, we see what a complexity there is in the activities in our world. There are two or commonly more agents in every act of causation, two or commonly more in all effectuation. What a variety of powers at work in the great natural occurrences, say in the seasons, say in the production of spring, with its increased heat, its buds and leaves and blossoms! What a complication in the production of the great epochs of history: in the spread of Christianity; in the revival of learning in the fifteenth century; in the great Reformation; in the English, American, and French revolutions! This complexity is vastly increased by the circumstances that the agents in combination possess properties which they did not exhibit in their separate state. Water exercises qualities which did not appear in the separate action of the oxygen and hydrogen. When combined in living plants and animals the elements exhibit powers, such as absorption and assimilation, not shown by the oxygen, hydrogen, carbon, and ammonia. I feel that there is need in this compli-

cation of a regulating power to produce order and beneficence. Without this all these powers might work capriciously and injuriously and have formed only powers of evil, mosquitoes, serpents, flaming meteors and burning worlds, destructive machines, and pestiferous creatures devouring each other and arresting all forms of beauty and beneficence, and yet incapable of dying. We find instead those millions of agencies combining to accomplish good and benign ends. All this seems to me to show that there has been a mind disposing and a wisdom guiding them.

To prove this it is not necessary that we should settle what are the original constituents of the universe: some suppose them to be atoms, some represent them as centres of force, some will allow them to be only centres of motion. Some of our most distinguished physicists, such as Helmholtz and William Thomson, are favoring the idea of Descartes, somewhat modified, that they are vortices in perpetual whirl. Whatever they be, they need a wise and good disposal to make them perform bountiful ends. I discover traces in nature of various kinds of design.

I. There are concurrences of agents to accomplish special beneficent ends. Take the eye. What a combination of independent agencies before we can see the smile on that friend's face! There are vibrations coming from the sun ninety millions of miles away; these have passed at various rates through an ether, they touch and are reflected from the countenance; some of them reach the corner of an optical instrument called the eye; they go through an aqueous humor, thence through the gateway of iris into the crystalline lens; they are there refracted and pass through the aqueous humors to the retina, where they impact on thousands of rods and cones, and are sent on to the optic-nerve and the brain; and we now see the smiles on our mother's face. Let any one of these be absent or fail, and nature would remain forever in darkness. Take the ear. A sister utters a word, a vibration is started, it reaches our ear, is collected by the outer ear and knocks on the tympanum, is propagated into the middle-ear, where it sets in motion the hammer and the anvil and the stirrup, thence it penetrates into the inner ear, where it vibrates through a liquid, affects the thousand and

more organs of Corti, is sent round the semicircular canals into the cochlea, on through the auditory nerve into the brain; the silence is broken, and we are cheered by a voice of love.

II. We may discover a plan and purpose in development as it is carried on in our world. Development is evidently not a simple power in nature like mechanical force or chemical affinity or gravitation. It is clear that there is a vast, an incalculable number and variety of agencies in the process, whether it be the development of the plant from its seed, of the bird from the egg, of the horse from its dam, of the threshing-machine from the flail, of the reaping-machine from the reaping-hook, of our present kitchen utensils from those used by our grandmother.

Development is essentially a combination of causes fulfilling a purpose. It is an organized causation for ends, a corporation of causes for mutual action: It has been admitted for ages that causation works through all nature; not only divine causation, the source of the whole, but physical causation; that is, the ordinary occurrences of nature are all produced by agents working causally; in other words, fire burns, light shines, and the earth spins round its axis and rotates round the sun, and the consequence is that we have heat and light and the beneficent seasons. Men of enlarged minds do now see and acknowledge that in the doctrine of causation, in the doctrine of God acting everywhere through second causes, there is nothing irreligious. On the contrary, the circumstances that God proceeds according to laws is evidently for the benefit of man, who can thus from the past anticipate the future and prepare himself for it. On the same principle I hold that there is nothing irreligious in development, which is just a form of causation. It was my privilege in my earliest published work to justify God's method of procedure by natural law. I reckon it a like privilege in my declining life to defend God's method of action by development, by bringing the present out of the past.

There is an arranged combination necessary to produce evolution. The present is evolved out of the past and will develop into the future all under an arrangement. The present is the fruit of the past and contains the seed of the future. The configuration of the earth, its hills and dales, its rivers and seas, which determine the abodes and industries of men and the

bounds of their habitation, have been produced by agencies which have been working for thousands or millions of years. The plants now on the earth are the descendants of those created by God, and the ancestors of those that are to appear in the coming ages. There is through all times, as in the year, a succession of seasons; sowing and reaping, sowing in order to reap, and reaping what has been sown in order to its being sown again. This gives a continuousness, a consistency, to nature amidst all the mutations of time. There is not only a contemporaneous order in nature, there is a successive order. The beginning leads to the end, and the end is the issue of the beginning. This grass and grain and these forests that cover the ground have seed in them which will continue in undefined ages to adorn and enrich the ground. These birds that sing among the branches and these cattle upon a thousand hills will build nests and rear young to furnish nourishment and delight to our children's children in millennial ages. Every naturalist has seen a purpose gained by the nutriment laid up in the seed or pod to feed the young plant. I see a higher end accomplished by the mother provided for the young animal. That infant is not cast forth into the cold world unprotected: it has a mother's arms to protect it and a mother's love to fondle it. Development is not an irreligious process; every one who has been reared under a father's care and a mother's love will bless God for it.

"Evolution," says Herbert Spencer, "is a change from an indefinite, incoherent homogeneity to a definite, coherent homogeneity through continuous differentiation and integration." He has sufficient philosophy to refer all this to a power supposed by him to be unknown working behind the known phenomena. A deeper philosophy will discover a so far known divine power producing these effects.

In development there is usually progression. At times there is degeneracy, chiefly the result of human sin, as we see in the degeneracy of the Indians. But as a whole there has been an advance in our earth from age to age. The tendency of animal life is, upon the whole, upward—from all-fours to the upright position, in which men can look up to the heavens. Agencies have been set agoing to produce these evidently intended ends. Causes that operated ages ago have called in other causes to co-

operate with them, and have thereby added to the power and riches of the product. The geological changes have made our earth fit for the abode of man. Human beings have taken the places which in earlier ages were handed over to wild animals. There is a greater amount of food produced on our earth than at any earlier stage. There has been, as the ages rolled on, a greater fulness of sentient life and a larger capacity of happiness. The intellectual powers have been made stronger and firmer like the trunk of the tree, and the feelings like the flowers have taken a larger expansion and a richer color by culture.

I am inclined to see purposes in the very forms of animals and plants, and the manner in which they grow into their type; while the type ever advances as if to realize an idea. Our roses are all supposed to be derived from the common dog-rose, and I see a beauty in that rose as it grows by the roadside. But I discover a higher manifestation of skill in the way in which the rose becomes more fully expanded in our gardens. God, who rewards us for opening our eyes upon his works, bestows higher gifts on those who in love to them bestow labor upon them. Dogs, it is said, have all descended from some kind of wolf, and I see a fitness in their primitive forms; but I discover a fuller development in the shepherd's dog and the St. Bernard dog with their wondrous instincts. I discover a fitness of parts in the old eohippus which used to tread with its five toes on marshy ground; but I discover an advance in the pleiohippus, and still higher perfection in the animal we ride on, so useful and so graceful, so agile and so docile.

III. I discover an end in the manner in which plants and animals are produced. Two systems of development are necessary to effect this. First, the tendency of every living thing to produce a seed or germ. The powers necessary to accomplish this are very numerous and very complex, but all conspiring towards this one end, as if it were one of the purposes for which the plant was created. Secondly, there is the development of the plant and animal from the seed or germ. This, too, implies an immense combination of arranged elements and forces. It looks excessively like an end contemplated, an idea to be realized. It looks all the more like this when we notice that the seed or germ is after its kind and produces a living being after

the same kind. There is thus a double development in all animated nature; we see it in the oak producing the acorn, and the acorn the oak.*

These are mainly operations of the ordinary physical forces which are all correlated with each other, needing only a disposing power. But there are in our cosmos other and higher powers. In closing let us look at these.

First. There is evidence of new and these higher powers appearing in the progress of nature. I have shown at an earlier part of this article that in physical causation there is merely a changed state of the agents acting as the causes. There is no power in the effect which was not in the causes. If heredity has a gift committed to it, it may transmit it from parent to offspring and from one generation to another. But if there be a new power appearing, it must be from superadded causes. But there are products in our world which cannot be developed from the original elements or powers of nature.

Was there Life in the original atom, or molecule formed of the atoms? If not, how did it come in when the first plant appeared? Was there sensation in the original molecule? If not, what brought it in when the first animal had a feeling of pleasure or of pain? Was there mind in the first molecule, say a power of perceiving an object out of itself? Was there consciousness in the first molecule or monad—a consciousness of self? Was there a power of comparing or judging, of discerning things, of noting their agreements or differences? Had they a power of reasoning, of inferring the unseen from the seen, of the future from the past? Were there emotions in these first existences? say a hope of continued life or a fear of approaching death? Perhaps they had loving attachments to each other, perhaps they had some morality, say a sense of justice in keeping their own whirl and allowing to others their rights and their place in this dance! Had they will at the beginning, and a power of

I "When will apologists begin to perceive that the best apology for the universe would lie in the belief that it was not designed at all?" This is the melancholy conclusion reached by Mr. Grant Allen in a review of Prof. Cleeland's recent work. Some are regretting that Mr. Allen should have become so slavish a follower of Spencer, and be using his power as a critic in the *London Academy* to depreciate those who have the courage to avow that they see design in nature.

choosing between pleasure and pain, between the evil and the good? Perhaps they had some piety, and paid worship of the silent sort to God!

It is needless to say that there is not even the semblance of a proof of there being any such capacities in the original atoms or force-centres. If so, how did they come in? Take one human capacity: how did consciousness come in? Herbert Spencer, the mightiest of them, would have us believe that he has answered the question, and yet he has simply avoided it. In his "Psychology" he is speaking of nerves for hundreds of pages; he shows that in their development there is a succession of a certain kind; and adds simply that "*there must arise a consciousness*"! This is all he condescends to say, bringing in no cause or link or connection. Thus does he slip over the gap—a practice not uncommon with this giant as he marches on with his seven-leagued boots.

It is pertinent to ask, How did these things come in? How did things without sensation come to have sensation? things without instinct to have instinct? creatures without memory to have memory? beings without intelligence to have intelligence? mere sentient existence to know the distinction between good and evil? I am sure that when these things appear, there is something not previously in the atom or molecule. All sober thinkers of the day admit that there is no evidence whatever in experience or in reason to show that matter can produce mind; that mechanical action can gender mental action; that chemical action can manufacture consciousness; that electric action can reason, or organic structure rise to the idea of the good and the holy. I argue according to reason and experience that we must call in a power above the original physical forces to produce such phenomena. I may admit that a body may come out of another body by the powers with which the bodies are endowed; but I say that a sensitive, intelligent, moral discerning soul cannot proceed from the elements of matter. New powers have undoubtedly come in when consciousness and understanding and will begin to act. They may come according to laws not yet discovered, but they are the laws of the Supreme Lawgiver.

I can find no more satisfactory account of this process than that in the opening of Genesis, where new manifestations appear

in successive days or epochs, the whole culminating in man in the image of God. "Howbeit that was not first which is spiritual [*πνευματικόν*], but that which is natural [*ψυχικόν*]; and afterward that which is spiritual." "And so it is written, the first man was made a living soul; the second Adam was made a quickening spirit" (1 Cor. xv. 44-46)—where we may mark the advancement from the merely living soul (*ψυχὴν ζῶσαν*) to the quickening spirit (*πνευμα ξωποιοῦν*).

Secondly. There are mental and spiritual powers working in our world. Of the operations of the mental powers we are conscious. I am quite as certain that I have thoughts and wishes as that I have hands and feet. But not only are there psychical acts, there may be spiritual powers. I am aware that some of our savans will turn away from such an idea not only with unbelief, but with scorn, declaring it to be inconsistent with the uniformity of nature, with all history, and with all science. But this arises not from the comprehension of their views, but from fixing their eyes so exclusively on their own favorite subjects that they do not see others lying alongside of them possibly higher and more important.

Earnest men in all ages have been seeking after intercourse with God. They have prayed in the belief that there may be One to hear them, and they have expected an answer. They do not allow to you that God has so shut himself out from his own world that he cannot act on it. They deny that there is any proof that our petitions are so bound to the earth by gravity that they cannot mount upward and reach the ear of their heavenly Father, who is felt as pitying them. They believe that their spirits can hold communion with God, who is a Spirit, quite as certainly as our earth can act on the sun and the sun on the earth. They have faith that there are wider and more intimate unions than those produced by the attraction which all matter has for other matter. They are sure that all holy intelligences throughout the universe are in union with the Holy God.

Christians believe that they live under the dispensation of the Spirit. We have seen that there have been in the history of our world times or seasons in which new powers, apparently always advanced powers, appeared. There was a time in which life appeared, in which consciousness appeared, in which intelli-

gence appeared and will appeared, and a conscience discerning between good and evil appeared, and the full man in the image of God appeared. There has been a like introduction of new powers, and a like advance in the revelation which God has been pleased to make of his will, first in the shadow going before, then in the grand Personage appearing in the fulness of time. The Jewish dispensation comes out of the patriarchal, and the Christian out of the Jewish, in each case something new being added. Under the old economy there were promises of the coming dispensation, and there were anticipations of it in persons moved by the Holy Ghost. It was thus in the geological ages; as Agassiz delighted to show, in lower creatures stretching up towards higher and towards man himself. But the full dispensation of the Spirit was introduced when the Mediator, having finished his work on earth, went up to heaven: "If I go away, I will send him unto you."

Christians believe that in this dispensation they have access to God. They maintain that science has nothing to say even in appearance contradictory. Some of the profoundest investigators of science have believed all this and avowed their convictions, such as Newton and Leibnitz, Brewster and Herschel, Faraday, Meyer, and our own Henry. They have been quite as sure of this as of their own great discoveries as to the laws of the universe.

No doubt these spiritual operations are not without law of some kind. But that law is not the same with the physical laws operating around us. It may be such that we cannot by searching find it out. The arc visible to us is too small to enable us to calculate the full circle or sphere. So we piously ascribe it all to the sovereignty of God. "The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh, and whither it goeth: so is every one that is bôrn of the Spirit."

JAMES MCCOSH.

THE SCULPTOR AND HIS ART.

IT was a habit of Socrates,—who was himself a sculptor, and the son of a sculptor,—when he would inquire into the philosophy of any subject, to seek the professional practitioner or teacher who claimed to be a representative, reasonably inferring that such an one would be well qualified to furnish the information he sought. He then applied his unrelenting system of inquiry with a keen-scented persistency that was quick to expose ignorance or fallacy. This method of inquiry as practised by Socrates, which confronted him at once with the true representatives, we cannot do better than imitate. To the *atelier*, or workshop, therefore, we will go, where, surrounded by the implements of his art, we shall find the sculptor engaged in the practice of his calling. The artist may not be always able to give a reason for his practice—as Socrates sometimes found to be the case—but the *atelier* affords ample illustration even of principles too subtle for logical solution. The studio of the artist is the amalgamation of the study and the workshop. The technical and the intellectual, practice and theory—even the mechanical and the emotional—are there blended harmoniously as one in the service of art.

The fundamental element in sculpture is form. The forms of objects are principally recognizable to the eye by means of outline and shadow; the first gives the impression of shape, the second that of relief. Outline and shadow, therefore, constitute the elements of form as regards our visual impressions. Colorless objects that are equally illuminated from all sides, tho their surface be roughened or irregular, give no impression of relief save what is suggested by their outlines. The landscape viewed from a height under a meridian sun has few distinctions of form;

but as the day declines the lengthening shadows reveal a varied and broken panorama: hills, valleys, and even the gentler undulations of surface greet the eye.

Sculpture is the least complex of the formative arts; but from this we are not to infer that its merits are of an inferior order. Excellence in all the arts is of equal merit, and if there be any distinctions of this kind, we may conclude that excellence is of a higher order in proportion to the simplicity of the means employed. It is the equable character of true excellence in art that places on the same plane Homer, Phidias, and Raphael or Michael Angelo, as merely varied exponents of the same creative power.

Again, with reference to form as the basis of sculpture, there are two distinctions that should be borne in mind, viz., the *science* of form and the *sense* of form; the first relates to fact, the second to feeling. The first is a matter of systematic knowledge; the second, of æsthetic perception. No artist is properly qualified in art who neglects these distinctions, or who fails to recognize their respective merits as contributing to manifestations of the beautiful. No amount of scientific knowledge of form will avail the sculptor in the absence of that artistic or emotional sense of it of which sculpture is an expression or representative. Nor will a fine artistic sense of form avail, in art, in the absence of a knowledge of anatomy. I once saw a statue, representing an athlete, that had attracted some attention from the fact that it was made by an anatomist—one whose knowledge of anatomy was justly held to be very considerable. Great accuracy of knowledge was displayed in the anatomical forms, while the action chosen was well adapted for muscular display. But for a work of art this conspicuous motive was a false one, the emotional character of the action or expression being subsidiary to the exhibition of knowledge. It excited curiosity, but stimulated no higher emotion, and the effect was, on the whole, repulsive.

On the other hand, examples are not rare, in sculpture, wherein is plainly recognizable the absence of accurate anatomical knowledge, the result being inane and valueless. Underlying the higher truth there must be a basis of natural fact, and the studies of the sculptor are directed to this end. But after veri-

ying his anatomical forms by constant reference to nature, the sculptor makes all this subservient to an emotional impulse of a higher kind. The imagination, regarding his work from an elevated plane, enables him not merely to endow his creations with life, movement, expression, but also to make them act in a noble and grand way. He aims not merely to represent the forms of life, but to express through form a still finer sense of beauty, not found in the model, but seen through the model, which is nature in a more select and permanent aspect.

But without further discussion of general ideas, we will go at once to the workshop. We will follow the sculptor in all his processes, from his rude first sketch to the completion of his statue.

The first step in every formative art is generally that of a rude sketch on paper; but it is not uncommon for sculptors to make even the first sketch in the clay—generally a very diminutive, hastily executed sketch, designed merely to express the general idea. The rude, first blot, in whatever form it may be, is a point of departure; it is the initial fact for the imagination to rest and work upon. Then follows what is termed a *study*—a larger sketch, in which the action and forms are determined with some care, in accordance with the conception as it exists in the mind. Generally in this second sketch reference is made to the living model, but not always. Before referring to the model, the artist desires to assert his *motive*—the conception he has himself formed in imagination. A too early reference to the model may substitute for this an action or motive conceived on a lower plane—the plane of the commonplace. In this model, either of clay or wax, the sculptor aims to express the action, the forms and general proportions, freely making changes as the sketch advances. It is not uncommon to make several experimental designs in different attitudes, exhibiting various actions, before he decides what will best conform to the leading idea. It may be that he studies this small model with great care, with continued reference to nature, and thus matures his conception.

If the proposed statue is to be of life size or larger, he proceeds to set it up in clay by proportional measurements made from the small model. The clay most commonly used is of a gray color, free from gritty substance, and moistened to a

proper consistency. The figure is built up about the supports—termed the skeleton—following the attitude and proportions of the original sketch. The clay is manipulated with the fingers, and the work, at this stage, is advanced by simple addition. This “setting up” of a statue, as it is termed, is generally performed by the sculptor’s assistants, who are guided by proportional measurements. When the material is all placed and the figure roughly shaped, the sculptor then takes it in hand and brings to his aid all the resources of his art. Every part is carefully studied from the life. The statue is first modelled nude, and afterward the forms are clothed. The drapery is super-added to the forms already modelled, by first running over them strips of clay to represent the folds or masses that are farthest removed; but where drapery sinks to actual contact with the body or limbs, the original surface is carefully preserved, tho characterized as draped by distinctions of texture and other like means. Textures and other variations of surface are given by various tools, usually made of wood. The clay is kept moist, and when the day’s work is finished it is wrapped in wet cloths, or covered with an air-tight screen to retard evaporation.

It is important for the sculptor to design his statue so as to avoid, as far as possible, the extension of any part of the figure insecurely. He must also bear in mind where the statue is to be placed, and in what material it is to be finally wrought—whether it is to be of marble or of bronze. If it is to be of bronze, he may have certain liberties of which the marble does not admit, the brittleness of the marble necessitating a more compact mass. Where the design necessitates extended limbs, the ancients often resorted to artificial supports; but this has been avoided in modern times, as they interfere with the beauty of the statue or group. In bronze-work there are many difficulties encountered in casting complex forms, but skilled founders find ways of surmounting them. Benvenuto Cellini, in his autobiography, gives a very interesting account of the casting of his “Perseus,” explaining these difficulties and the care necessary to overcome them. One of the most remarkable pieces of bronze-casting is that of the beautiful gates of the Baptistery at Florence by Lorenzo Ghiberti, of which Vasari gives an account.

But this is anticipating. Let us dwell more particularly on the clay model; for it is here that the sculptor displays his true powers, his finest skill. The genius of the artist finds expression in the pliant clay. With that delicacy of touch by which the skilled musician modulates sound the sculptor gives expression to the yielding clay. Having the living model before him, he seizes upon that which is expressive and characteristic. Avoiding trivial accidents and incongruities, he seeks that unconscious grace, or it may be that virile action, that is truly natural and pleasing. His great concern is to conform the outward action to the inward impulse, that his work may appear artless rather than artful; every action being free and unconstrained, spontaneous in movement rather than conscious or studied. Few things have greater fascination for the observer than that of witnessing the clay start into life under the skilled manipulations of the sculptor. Slight modifications of form will sometimes make it quickly assume the character of life. The process itself, passing from generals to particulars with true logical sequence, is a most suggestive one, well calculated to stimulate thought in many analogous ways. In composing his statue, the sculptor must regard it from all points of view. Unless designed to fill a niche, it must be so studied that it composes agreeably from eight distinct points of view—the front, the rear, the sides, and obliquely. Indeed, his work is in itself a real object, while the painter's representation is but the semblance of reality—the imitation of the appearance. In contrasting his own art with that of painting, a sculptor once said to me, "There is a satisfaction in being able to walk round your work, to regard it from all points of view as a real, palpable object." And that indicated the character of the sculptor's peculiar sympathy for form, heightened by the sense of reality and substance.

The statue, therefore, must present from every point of view an agreeable form or outline. In process of modelling the clay rests on a revolving base, that the figure may be turned readily when the sculptor desires to view his work from different sides; and after every considerable addition it must be so regarded. A distinct manipulation of the clay is required to represent all the distinctions of surface as to the character of flesh or of drapery. Qualities of hardness or softness, roughness or smoothness, are

represented with delicacy or boldness as the case may require. It is upon the clay that the sculptor bestows all his energies, even to the extremest finish the character of the work demands. What follows is mainly of a mechanical nature.

When the statue is completed in the clay, the *formatore* then makes from it what is termed a "waste-mould" of plaster of Paris. A waste-mould is distinguished from a piece-mould in that it serves but for one cast, in the forming of which the mould is destroyed by being clipped off with the chisel. In the forming of a waste-mould the clay model is entirely wrecked. The mould is then washed and coated with boiled oil, and when dry it is fitted together and a perfect plaster cast is made. This the sculptor receives from his workmen and proceeds to bestow upon it additional labor. In the place of wooden tools, he now uses those of steel—rasps, chisels, and toothed implements of various kinds. In the plaster the statue is brought to a point of actual finish regarding every detail. The change from the gray clay to the white plaster is a marked one, and often suggests changes to be made, by reason of fresh observation consequent upon the nature of this new material.

After its completion in plaster, the statue is either reproduced in marble or conveyed in sections to the foundry. If the statue is to be of marble, the workmen cover the surface of the cast with innumerable minute cross-marks, and project from the raised parts a few points of steel, which serve as guides for the measurements for its reproduction in stone. With the calipers they determine all the elevations and depressions, and follow mechanically every variation of surface in the model. Vasari, in his life of Michael Angelo, thus describes this process: "A figure of wax or other firm material being laid in a vessel of water, which of its nature is level at the surface, on being gradually raised first displays the more salient parts, the less elevated still being hidden, until, as the form rises, the whole by degrees comes into view. In this manner are figures to be extracted from the marble with the chisel; the highest parts being first brought forth, till by degrees the lowest parts appear."

Of these various materials in which the statue is wrought, Michael Angelo said: "The clay represents life; the plaster,

death; and the marble, a resurrection." The clay is yielding and expressive; the plaster, rigid and unqualified; and the marble revives again the finer qualities and lends to them a translucency of its own. When the statue is hewn from the marble—a labor of many months—it returns again to the sculptor, who gives to it an expressive finish in conformity with the spirit of his original conception. He obliterates the mechanical execution of his workmen and bestows upon it a facile grace, or delicacy of expression, that deceives one with the belief that the statue has come forth from the marble with the ease and celerity of the thought itself in its original conception.

But if the statue is to be of bronze, the last labors of the sculptor are bestowed upon the plaster model. When this is completed, it is cut into sections and conveyed to the foundry. It is there cast in sections, generally, and these are afterwards joined, finished, and chased by skilled artisans. The bronze is then toned, or darkened with acids—and so the work is done. As the original models are retained by the sculptor, his studio becomes populated with his works, that may be reduplicated to any extent; in which respect he has an advantage over the painter. There is an endurance, also, about this art that is impressive: the marble and the bronze live forever, while the masterpieces of pictorial art perish with time, and become, as with the Greeks, merely a vague tradition. The powers of the orator and the actor die with them; those of the painter may survive a thousand years, or by extraordinary chance, as in the Pompeian frescos, to twice this period; but sculpture endures throughout the ages. The museums of Europe contain Egyptian statues and reliefs that belong to the fourth dynasty—as early as the forty-second century B.C. The endurance, therefore, no less than the palpable reality of sculpture give to it a value peculiarly its own.

The location of statues governs, in a measure, the character of their execution. Those which may only be seen from a distance should be more rudely executed to give the desired effect; and yet the Greeks paid little heed to this. The Phidian statues from the pediments of the Parthenon are, many of them, finished with great care. The "Theseus," the "Ilissus," and the beautiful group of the Fates are finished with extreme care. The Greeks

apparently followed the beautiful for its own sake. They neglected nothing. Phidias, when asked why he bestowed such care upon those parts of his works which, necessarily, were shut out from view, is said to have replied, "The gods see them, and they must be satisfied." A moral lesson truly, whether applied to art or to life itself.

Greek statues of single figures not designed to serve as architectural ornaments—such as the Apollo or the Venus—are equally beautiful from every point of view from which they are regarded; while a bas-relief, like a picture, is to be viewed in front alone. As compared with painting, the range of subjects admissible in sculpture is limited. Single figures serve best to express the finer qualities of this art. Groups, as a general thing, belong to a subordinate plane. Even the most famous groups of antiquity bear a subordinate relation to single figures. Perhaps the finest instance of two figures thus grouped is that of the Fates—Ceres and Proserpine—belonging to the eastern pediment of the Parthenon. Groups comprehending more than two figures—as the "Laocoön," or the "Farnese Bull," particularly the latter—decidedly belong to a period of decadence in sculpture. The figures there stand in a picturesque rather than plastic relation to one another, and are necessarily viewed separately; thus are introduced conflicting elements that mar simplicity.

Every work of art interests us not merely from its intrinsic merit, but as a manifestation of the character of the creative impulse that is behind it. Statues belonging to the best periods of Greek art are simply and nobly conceived. There is no resort to novel or specious effects, or to mere elaboration for its own sake. The art is grand because it is the embodiment of a grand conception, and executed with a noble disdain for trivialities. It is beautiful for the reason that it is simple, natural, economical; nothing remains to be added or taken away; the whole is composed of strictly essential parts. The perfect correspondence of the form and action with the motive satisfies the mind. Every part, every division of the body, the limbs, the muscles, perform their functions naturally and economically; nothing is strained, no action is forced; the movement corresponds with that action of the mind that is composed even

in energetic and quick exertion, as in the throwing of a discus.

Proportion is an element of form that is of supreme importance in sculpture. There is an innate sense of proportion in most minds, but under cultivation this is capable of being greatly refined. Even an uneducated ear may easily detect disproportion in verse and discord in music. But it requires accurate technical knowledge to be able to detect how and why certain works of art fail in due proportions. But if there were no general sense of these things possessed in common, music would alone address the sensibility of the musician, and rhythm that of the poet; but in a general way we all share in a like susceptibility, but varied in degree, to these influences. A sense of human proportion is awakened by countless impressions that are stamped upon the mind by the sense, and natural selection evolves from these impressions an average, or ideal, underlying endless variations of the real.

In order that we may comprehend the school in which the ancients studied their athletes we should follow them to the arena, where they witnessed performances that called forth unstudied action under circumstances impossible now to imitate. The ancient Romans, especially the lower orders, including the slaves, were fond of sketching upon the walls of the ante-rooms such scenes as interested them most in these spectacles, and the greater part of them represent gladiatorial combats. Cardinal Wiseman has given an interesting description of some of these scratchings (*graffiti*, as they are called). "They present to us a class of very rude but very interesting monuments. One of them records a peculiar occurrence. It is indeed only a battle in the amphitheatre, but it is between two men in very different positions; the names of the combatants are given, as they always are, and numbers over their heads tell how many victories each one had achieved. This battle, then, is between Spiculus, a tyro—that is, one who had never before fought—and Aptonetus, *librarius*, or holding a high office among the gladiators, a man who had gained sixteen victories, as his number indicates. The first has over him the letter V—*vicit*, he conquered; the other, P—*periit*, he perished. In fact, the old gladiator, with the sixteen laurels that he had won, is lying on the ground wounded to

death, or dead; and the youth who had dared to fight him is alive, holding the point of his sword against the prostrate figure."

Such is the rude sketch as it remains upon the wall after twenty centuries have passed. But we must imagine the emotions with which these two men approached each other in deadly combat, with the eyes of fifty thousand spectators intent upon them—the one a veteran, crowned with sixteen victories, indignant that a stripling like that should presume to cope with him; the other ambitious of the great glory that awaited his victory. The sketch records the sequel. We may conceive with what intentness the eye of the spectator—the Greek sculptor—would observe every display of action, the tension of muscles, the swollen veins like knotted cords, the dilated nostrils as each stifles the anguish of a wound. "What the Greek sculptor knew how to seize, and alone had the opportunity of seizing, was the result of such deep, such extraordinary emotions as, acting outwards from the nobler organs, impressed themselves in that wonderful way we see represented in their art." They were not permitted to dissect the human body. Galen was obliged to study the ape for his approximate knowledge of human anatomy. The Greek or Roman arrived at the knowledge of the interior construction of the figure from what he saw without. But his school was an extraordinary one; for, as we have seen, he witnessed physical action under circumstances so intensified in interest, as in mortal combats, that the faculties of the artist were rendered acute and penetrating.

The athletic sports of the ancients also afforded fine opportunity for studying the physical form. Their five gymnastic exercises were boxing, running, wrestling, leaping, and throwing the discus. The physical form was developed by careful training. Persons of all ranks participated in these sports. Pericles had won prizes, and so had Socrates, and these triumphs were always regarded with pride. In these games the body was generally nude; the surface of the skin was rubbed with oil, to toughen the fibre. We see in one of the finest statues of the ancients—the "*Apoxyomenos*"—an athlete scraping himself with the strygil, after his return from the arena.

Thus we may form some idea of the nature of the experience

whence the Greek artist drew his inspiration and his sense of fine action and true proportion. That the ancients had certain fixed standards of proportion there is no doubt. By some it is claimed that the Greeks derived their standard of proportion from the Egyptians, and a statue known as the "Water-carrier," or the Egyptian Antinous, is adduced in evidence of this derivation; but the historic origin of their system we will not now discuss.

In Egyptian sculpture the proportions of their statues were rather more than seven heads high; they were equally poised upon both legs, often one foot is advanced, and the arms hang straight down on either side; or if one is raised, it is bent at the elbow at a right angle across the body. Their attitudes are simple and rectilinear, without lateral movement. In contrast with this, the Greeks, even in the earliest times, were freed from this rigid and constrained type. Between the Greek and the Assyrian there is thought to be a resemblance of forms and types that might indicate direct descent, if indeed the Greeks owed anything to foreign influence. Whatever may have been borrowed in the earliest times, the Doric migration created a new spirit which pervaded the Greek people and asserted their independence in forms of government, art, and life. Diodorus remarks that the Egyptian artists wrought after an exact measure, but that the Greeks were guided by the accuracy of the eye. Winckelmann refutes this, and indeed it is now well known that the Greeks employed in sculpture, as in their architecture, certain fixed ratios of proportion, which, however, differed at different times and with the change of subject. The Egyptian Antinous, now in the museum of the Capitol at Rome, is thought to embody proportions that are found applied in the finest examples of Greek art. The measurements derived from this statue are found to correspond to those of the "Theseus" and the "Ilissus," by Phidias, examples of the best period of Greek art. These portions have a wider application, covering a larger number of the best statues, than any other known standard. Vitruvius, tho writing on architecture, gives details and statements respecting the proportions commonly employed by Greek sculptors. He says, "The members of the body have certain proportions that were always observed by

the painters and sculptors" of his time, which was that of Augustus; and he adds, "We must always look for them in those productions which have excited universal admiration." He then designates these proportions as follows: "The measure of the head from the chin to the top of the scalp is an eighth of the whole body; the face from the top of the forehead should be one-tenth part of the whole stature." The face he divides, longitudinally, into three equal parts; the foot is, in length, equal to a sixth part of the stature. All measurements are longitudinal. "The height of the human frame is equal to its breadth when the arms are stretched out," etc. etc.

It is observable in the works even of inferior sculptors of Greece that the proportions of their statues are generally fine, altho in purely artistic qualities they may be poor. This, I think, evinces a knowledge of some system of measurement that was common to all their artists.

It is well known that in their baths, which were places of general resort for intellectual as well as physical discipline and recreation, they preserved accurate records of the measurements of their most distinguished athletes. If one was distinguished for strength, agility, or grace of form, he was measured accordingly, and these records doubtless supplied the data for determining a true system of proportional measurements. In modern times Massaccio, Leonardo da Vinci, Michael Angelo, Raphael, Albrecht Dürer, and other distinguished representatives of the arts, have left records of their search for accurate systems of measurement—they all sought to discover the system of the ancients. It is partly due to the accuracy of the principles taught, and to systematized knowledge of this kind, that is to be attributed, in some degree, that prevalent excellence in art manifested in Greece in the time of Pericles, and in Italy in the fifteenth and sixteenth centuries. Dürer, in the preface to his treatise on mensuration, complains that young painters were too often allowed to grow up in ignorance of the principles of proportion as applied to the human figure. He divided the height of the human figure into seven parts, each having the same length as the head. Again he divided it into eight parts. A woman, he concluded, should be an eighteenth part shorter than a man; and in his proportional measurements of the female

form he follows, perhaps unwittingly, the celebrated standard of the *Venus de Medici*. He also gives ludicrous examples resulting from mathematical variations of proportion, or the exaggeration of one proportion at the expense of another.

Leonardo termed himself "the admirer of the ancients and their grateful disciple; but one thing," he adds, "is lacking in me, viz., their science of proportion." In his own treatise on this subject he thus writes: "In general, the dimensions of the human body are to be considered in the length and not in the breadth, because in nature we cannot in any species find any one part in one person precisely similar to the same part in another." He "divided the form of bodies into two parts; that is, the proportion of the members to each other, which must correspond with the whole; and the action, expressive of what passes in the mind of the living figure." A man, he adds, has the length of two heads from the extremity of one shoulder to another; the same from the shoulder to the elbow; and also from the elbow to the fingers. He agrees with Vitruvius that a well-proportioned man is ten times the length of his face.

Michael Angelo, as the result of a long life devoted to the study of the human figure, sixteen years of which were given to the study of anatomy, declared that there was a harmony of the proportions throughout, and that "these proportions have a law."

The importance of proportional measurements to the sculptor is apparent in his daily practice. Every statue is "set up" by means of such measurements; and if it be of colossal size, the symmetry of the whole cannot otherwise be attained. An ideal exaggeration like that of the *Farnese Hercules* could not well be produced without it; for in that statue the exaggeration of the general proportions is not only admirably sustained throughout, but every individual muscle is developed harmoniously in accordance with that exaggeration, and strictly parallel with nature, tho far removed from nature's accustomed practice.

Heroic proportions with the Greeks generally included in the height of the figure eight heads; the common standard for minor, or portrait, subjects was seven heads. Thus the smallness of the heads of many ancient heroic statues was the result of deliberate design; as was also the lengthening of the lower limbs

beyond the proportions usually found in nature, which lent dignity and elegance to the figure. Winckelmann asserts that the rules of proportion as adopted in art from the human figure were first established by sculptors, and afterwards became canonical in architecture likewise. He states that among the ancients the foot was the standard of the larger measurements. Vitruvius states that the ancients gave their statues six lengths of the foot. Modern sculptors generally adopt the head and face as standards of measurement. In general, the face may be thus divided into three equal parts—the forehead, one; the nose, another; and the mouth and chin included in a third. The ear is of the length of the nose, and parallel with it. The space between the eyes is of the width of one eye, and the base of the nose is of the same width; the mouth half again as wide.

Every sculptor who is thoroughly conversant with his art has these proportional measurements instinctively in mind, and applies them accordingly in modelling a bust or statue. Of course the individuality of portraiture necessitates accidental deviations from arbitrary rules.

A few suggestions may be made with reference to action or pose, as evinced in sculpture. All outward actions of the body proceed from some inward impulse of mind, unconsciously perhaps, but nevertheless they bear strict relation to character. The ancients regarded slow movements of the body as a characteristic of dignity and the profounder movements of thought. Demosthenes reproaches Nicobulus for his quick mode of walking: he connected impudent talking with quick walking. An elegant composure of action is a marked characteristic of Greek art. There is perhaps no more marked contrast in art between the ancient and modern idea of the manifestation of supreme power than that afforded by the Jupiter of Pheidias and the Christ of Michael Angelo, as depicted in his "Last Judgment." In the first the expression, the action, is one of repose—power at rest, unexercised, undefined, consequently unmeasurable. But the Christ of Michael Angelo, putting forth his denunciation of the damned, evinces a power that must exert itself for a special object, and with a vehemence that is disproportioned to a just conception of that power. The up-

lifted arm and the lowering features, therefore, suggest finite limitations less grand than the idea of supreme power conceived by the ancients.

As refined taste, no less than great elegance, was displayed by the ancients in their draped statues, drapery is by no means an unimportant element of beauty in sculpture. As more draped than nude figures were executed in the early periods of Greek art—and this continued to be the case in regard to female figures even in the most brilliant epochs, “so that fifty draped statues may be counted for every nude one”—it was, of course, the aim of the sculptor at all times “to attain not less to elegance in drapery than to beauty in the nude figure.”

The statues of goddesses and heroines are always draped, with the exception of Venus and the graces. The dress consisted of an upper and an under garment, the *pallium* and the *tunic*—the *pallium* of the Greeks corresponded with the Roman *toga*; the *tunic* was of linen; both garments were usually white. The women frequently wore three garments—the mantle, the *tunic*, and an undergarment of some light fabric, without sleeves, which was fastened together at the shoulder with a button. The usual manner of wearing the *toga*, as seen in ancient statues, was to draw it under the right arm and cast it over the left shoulder. Elegance was not considered by the ancients a property of the dress itself, but as imparted to it by the wearer in the arrangement of its folds. The earliest Romans are said merely to have worn the *toga*; the *tunic* was a later addition. Augustus was reproached for the weakness of wearing nether-garments in cold weather. The Greek statues of Demosthenes and Sophocles are clothed simply with the *pallium*, or *toga*. The ancients were never dazzled with the merely ornamental.

The following selection from the “Charmides” of Plato may serve to suggest something of the Greek susceptibility to the beauty of physical form: “‘I will question them,’ said Socrates, ‘whether among the youths of the time there were any that were distinguished for wisdom or for beauty, or for both.’ On this, Critias, looking towards the door, where he saw some youths coming in wrangling with one another, and a crowd of others following, said: ‘As for beauty, Socrates, you may judge for

yourself; for those who have just entered are the admirers of him who is reckoned the handsomest young man now going; no doubt they are his precursors, and he himself will soon be here.' 'And who, and whose son, is he?' said Socrates. 'You know him,' answered Critias, 'tho he was a child when you went away. It is Charmides, the son of our uncle Glaucon, and my cousin.' 'By Zeus! I knew him,' said Socrates; 'even then he was not ill-favored as a boy; but he must be now quite a young man.' 'You will soon know,' replied Critias, 'how big he is, and how well-favored.' And as he spoke, Charmides entered. He did seem to me wonderfully tall and beautiful, and all his companions appeared to be in love with him, such an impression and commotion did he make when he came into the room. Other admirers followed him. That we men looked at him with pleasure was natural enough; but I remarked that the boys, even the smallest, never took their eyes off him, but all looked at him like persons admiring a statue."

THE REGULATION OF RAILROADS.

IN attempting to define the limits of legislative control of railroads, whether *de jure* or *de facto*, the first requisite is to find with whom, and subject to what conditions, the ownership of them lies. Mankind in their simplicity have believed, and wrought their faith into their fixed and not easily changed modes of speech and action, that those whose funds build the roads own them. If the State builds a railroad, it owns it, as the State of New York owns the Erie Canal. If private individuals, under a charter of incorporation from the State, build a railroad or canal, paying all charges for land, construction, and equipment out of their own pockets, as they have built the New York Central alongside of the Erie Canal, they own it. But no. According to that master of bright legal paradox, Judge Black, in his recent letter, it seems that the common-sense of mankind, asserting itself in its habits of speech and action, has been all astray on this subject. He tells us, "The corporations who have got into the habit of calling themselves the *owners* of the railroads have no proprietary right, title, or claim to the roads themselves, but a mere franchise annexed to and exercisable thereon." A little farther on, he likens the proprietorship of the stockholders of a railroad to that of a collector of a port in the custom-house he occupies in the discharge of his office. That is, they are not owners at all. The \$5,000,000,000 expended by our own and foreign investors in our railroads give them no ownership whatever. They belong to the State. On whatever theory such a doctrine may be defended, those who advance it need not shrink from being called communists. If this is not communism as respects this immense mass of property, we look in vain for it. Farmers and all other property-holders may as

well understand, withal, that no private property can long survive the grasping of railways by the State. Some indeed, as Mr. Henry George in his "Progress and Poverty" (p. 364), who favor the latter, are already pressing the confiscation of land by confiscating its rents.

But it is said that the State owns these properties because a part of the land they occupy has been obtained, by the exercise of the State's power of eminent domain, from such proprietors as would otherwise refuse to part with it, if not utterly, yet at any fair rates. But this is only the power to get it by paying a fair price, judicially ascertained. To whom does it belong if not to him that pays for it, and so obtains a deed for it? Of course the State aims in granting this high power, to secure a public benefit otherwise unattainable, by enabling parties willing to incur the expense and risk, to provide means of transportation so indispensable to the people as railways. But could private capital be found to build and run them if it were understood that those who pay for them do not own them? Never. With such an understanding there would not be one mile of railway where now we have ten, and this only of the poorest kind. Besides, what are railway mortgages or debentures worth if given by those who are not owners of the property?

However the title to the railway is acquired by its proprietors, in all circumstances it is subject to State taxation unless expressly relieved by its charter, and also to what is known as the police law of the State, which applies to all property according to its kind. This is simply the means by which the body-politic protects itself from harm. It aims to enforce the principle, *sic utere tuo, ut alienum non lædas*. All laws designed to protect from injury or destruction the persons or property of those having to do with railroads, whether in moving upon or about them, such as requiring proper brakes, gates, cattle-guards, fences, switching safely, etc., fall under this head.

Railroads also fall under the provisions of the statute and common law respecting common carriers. This because they are such. And this law applies to them in a manner corresponding to their nature and peculiarities, holding them to reasonable precautions to insure safety; responsibility for losses and injuries to persons and property transported

by them arising from want of due care ; also to impartiality in their dealings with, and treatment of, all parties applying for transportation by them. Further, like all other common carriers, the common law requires that they shall be "reasonable" in their charges and accommodations, all circumstances considered. All this may be assumed, for the purposes of this discussion, to be enforceable before our courts at common law, without special enactments, however these may sometimes be adopted by legislatures *ex abundanti cautela*. But it is not so much the *principles* of impartiality and reasonableness in fares and accommodations that are in debate, as the proper interpretation of and mode of applying them in relation to the peculiar and immensely complicated circumstances of railroads. The consideration of these will bring into its sweep the vexed question of discrimination in rates in all its aspects.

Reasonings based on supposed analogies between railway and other modes of transportation are very apt to mislead. English railroad legislation long proceeded on the theory that they were part of the "king's highway." It tried to fix tolls of particular articles or classes of articles, till they were found to be beyond enumeration or feasible classification, and the whole attempt, like many other forms of legislative interference, has been gradually abandoned as beyond even the "omnipotence of Parliament." With the advantage of unity of government and smallness of territory, regulation of railroads by Parliament has been getting more and more minimized, till some of the pet schemes of our own reformers have been discarded, because outgrown or proved mischievous by experience. The railway is a thing *sui generis*. It is a highway, resembling a turnpike or canal only in this respect : that it is for purposes of travel or transportation by all who desire to use it, according to the conditions peculiar to it. If built by private capital, it is privileged to obtain a fair remuneration for this, provided the public use of it is sufficient for the purpose.

The fixing of the rate of highway tolls by the charter, or by the legislature, is confined to a few simple things, for which just and plain rates can be made with comparative ease. Neither are such roads common carriers. Those who use them may become common carriers, as they may use any roadway or water-way,

natural or artificial, in conformity to its nature, for this purpose. But railroads, while possessing immense capacity for transportation, can only be used by their owners or lessees. Not only must the road-bed and track be theirs, but all the cars, engines, rolling-stock, machinery, and conveniences for transportation must be so, and worked wholly by them. Theirs alone is the power and responsibility. Otherwise these roadways could not be worked a single week without numerous collisions and wreckings. They can transport for others, but they cannot allow others to put their own cars and engines on their road at pleasure. Their charges must be for transporting persons and freight in vehicles, and by motors and employés wholly their own, or wholly subject to their control. Now this involves an enormous expense for repairs of road, track, bridges, locomotives, cars, motive power, the vast pay-roll of employés, etc., which must be reimbursed from receipts for what they transport; if possible, too, with due remuneration to the capital invested. Here is a vast complexity of expenses, also, in the kinds and amounts of the articles transported, and of the conditions and circumstances which affect the relative cost of such transportation. It is not within the capacity of any legislature, or commission thereof, to adjust a tariff with reference to each article, or classification of articles, that shall be always and everywhere reasonable. The problem is so intricate as to prevent more than an approximate adjustment of it, even after the longest experience, by railroad experts and officials themselves. It is ever growing upon them with new elements of intricacy, and tasking their ingenuity for solution. The past twenty years have shown that fluctuations in the price of labor and the purchasing power of legal-tender money, not less than other causes, render any just fixing of rates by law impossible.

Meanwhile, nothing in the premises impairs the obligation of impartiality on the part of railroads towards their patrons; that is, of affording all, equal accommodations at precisely equal rates, under precisely like circumstances. If A and B, at the same time and place, ask like rates for precisely like service, impartiality requires that they both be treated alike. That there have been some rather gross violations of this is *prima facie* established by the testimony taken before the Investigat-

ing Committee of the New York Legislature; pre-eminently in the case of the Standard Oil Company and its accessories. If the railroads made any contract, as is alleged and we have not seen disproved, with this company or its accessories which were refused to others in like circumstances, and especially a covenant to protect any of these corporations from "competition," all this is beyond their legitimate province, and contrary to public policy and morality. No denial nor adequate justification of having made considerably lower charges for grain transportation to some great houses in New York than to others has been brought to our knowledge. Probably a sufficiently keen experience of the effect of such real or apparent partiality has been had to prevent its repetition. Probably, too, without the veil of secrecy these transactions would not have occurred.

On the other hand, we see no sufficient reason for anti-discrimination statutes based on the assumption that, in order to be reasonable and impartial, rates must vary just in proportion to the amount, distance, or speed of transportation. In order to partiality, unequal favor must be shown to different persons in like circumstances. Now this does not apply where a greater proportionate charge is made for a shorter than a longer haul of the same goods, when the expense of terminal handling is the same for each. A high authority, speaking from experience, says that the terminal expenses in New York, interest of capital and all else considered, are equal to one hundred miles of haulage. Consequently the cost of freight-carriage from New York to Newark, nine miles, is more than half that to Philadelphia, ninety miles. It varies, too, with severity of grades, cost of construction, fuel, etc. Nor does a failure to vary charges as the amount carried, *ceteris paribus*, necessarily infer partiality. It is so evident that larger amounts can be carried proportionably cheaper than smaller ones, that this has generally been conceded by the most extravagant adversaries. It is perfectly evident that one thousand car-loads could be profitably taken from Chicago to New York at proportionably lower rates than twenty. Nay, more: it is demonstrable that it sometimes costs more to carry a single or few parcels, parts of car-loads, car-load, or car-loads, a shorter distance than a longer, over which trains loaded to the full capacity of the engine can be carried to

adequate terminal facilities. A full train of anthracite coal can be taken from Easton to Trenton at fifty cents per ton. To drop a single car-load of six or eight tons at a way-station on the road would, we learn, cost four dollars, besides the cost of the haul there. It can hardly be questioned that a full freight-train from Chicago to New York can take on its full maximum there at a cheaper rate per car than it can switch off and otherwise handle from one to half a dozen cars at Fonda, Deposit, Cresson, or Martinsburg.

Anti-discrimination statutes, hardening into inflexible laws, may cause more real partiality than impartiality. Mathematical ratios seem very conclusive in the abstract, until, in their concrete application, they are often antagonized by forces as inevitable as those which thwart the finest contrivance for perpetual motion. The law of impartiality is right. Any fixing of rates by law to enforce, is pretty sure to defeat it, as much so as a law that street-cars and omnibuses should charge in exact proportion to the mileage, or hotels in proportion to the stay of guests, irrespective of other considerations. What cannot be accomplished by competition, the desire of patronage, public opinion, and the like, in these respects, never can be effected by mathematical legislation. Imperfections and grievances will doubtless remain, at the best, here and everywhere. But all these things in railroads, and other matters innumerable, whether, as Lord Coke said, "affected with a public interest" or not, might be immeasurably worse. In our opinion legislative interference of the kind invoked would be sure to make them so. Such has been the effect of it in the Granger States, in Colorado, in Great Britain, where, of one kind and another, it has been annulled or minimized after experience of its unhappy effects.¹ The courts can now enforce impartiality as binding at common law on the common carrier. It is for them to determine in each concrete case brought before them, whether and how far parties differently charged or otherwise treated were in such "like circumstances" as to constitute the action complained of a breach of impartiality. But legislatures can rarely frame laws to determine this that would not encounter as many exceptions as a

¹ See "Railroads: their Origin and Progress," by C. F. Adams, Jr., pp. 80-90.

revival of the obsolete laws fixing the price of bread and meat, or a law that merchants should show impartiality by charging at the same rate for a piece, a bale, or a hundred bales of the same kinds of goods, and not higher than a certain maximum profit of ten per cent in any case. As to any secret rates, drawbacks, rebates, contracts inconsistent with this impartiality, they are not to be defended. Yet we find that Belgium, in working her own state railroads, fell into the system of "special rates."¹ Abuses of this sort have grown up which due publicity will rapidly reduce to a minimum.

But it will not do to say that a railroad may not regulate its rates to a reasonable extent for the purpose of developing business on its line, because the power is liable to abuse. All power has this liability. Denied this privilege, many of them would never be built, especially those depending on land-grants or running through new and sparsely settled countries. No doubt special rates may be made in order to plant or develop or keep alive a business that will directly or indirectly bring valuable patronage to the railroad. Still this must be subject to the law of impartiality; i.e., it must be done alike for all and each in like circumstances. "Reasonable" is the standard established by the common law in regard to all demands by and upon railroads, whether relating to the police regulations for the safety of all persons and property dependent on their care and vigilance, or to the requisites to impartiality. The courts are to ascertain and judge of this "reasonableness" in actual cases brought before them. No cast-iron statute inflexible to circumstances can do it. And this reasonableness may vary with the circumstances of different roads. It might seem a good law that no cars shall be run without Westinghouse air-brakes. How soon may a cheaper and better brake be invented? Or how many roads are unable without bankruptcy to come up to this grade of high equipment? A decision in a recent case by a Kentucky court shows how exquisitely such a tribunal may ascertain the "reasonable" in an actual case, when an unbending statute would be a signal instance of *summa lex, summa injuria*. It was a question of damages for the death of

¹ "Railroads: their Origin and Progress," p. 90.

a person caused by the wrecking of a train running into a herd of cattle on the track, where there was no negligence on the part of the employés of the road, or failure to use all available means to prevent the disaster. But it was proved that, with Westinghouse air-brakes, it might have been averted. Hence it was claimed and adjudged that the company was able to provide them, and therefore liable for lack of due care and diligence in not providing them.

We have seen how utterly inapt legislation is, which attempts to proportion charges to distance or amount of transportation in all circumstances. Moreover, the *value* of the service of the railroads at different places must or certainly ought to weigh in determining charges. The value of any service, when rendered to others for compensation, is what they can pay with advantage, and will pay, rather than not have it. Now, in the case of railway transportation, that value varies greatly for a like amount of service at different places and times. Where there is a competing water or railway communication, exactly the same service may be worth far less than where there is none, and more at some of these latter places than at others. The number of railroads is large which cannot pay expenses, unless they can charge all along the line in some proportion to the value of the service rendered. The number is much larger in which no proper remuneration of capital can be made without this liberty. They cannot fairly live without adding to the higher rates which they can command where there is no competition, the lower which is the most they can get where there is competition. Without this they may be unable to maintain the expenses of the trains that carry all they can get, but not to half their capacity, at the higher rates. If they were shut up to either class alone, or if they were obliged to carry all at the lowest rates of competitive points, they could not live, much less thrive, or get beyond that starving standard which necessitates the highest rates for the poorest service, and adds to a famishing railroad a famishing population alongside of it.

All this is conclusively demonstrated by M. de la Gournerie, Inspector-General of the French Corps of Bridges and Highways, to be true not only of railway but other modes of transportation, in an article published in the "Bulletin of the Society for the

Encouragement of National Industry in France," and republished in the Appendix to the volume of "Testimony of George R. Blanchard before the Investigating Committee of New York State." (pp. 682-3.)

This brings us to the "pooling" now so largely adopted by the railroads at their great competitive centres, especially in the interior, for carriage to the seaboard.¹ There have no doubt been just causes for grievance to shippers and merchants in the sudden fluctuations of rates of transportation from these great centres, thus adding another element to the capricious uncertainties so baneful to sound business. It was the shock of competition between these colossal carrying agents—a shock as inevitable as the collisions of trains which made such havoc with life, limb, and goods in the early days of railroads, and which, after all the securities devised to prevent them, will occasionally recur. Desperate unregulated competition tends sooner or later to the ruin of the roads and the injury of the people. Now there are only three ways of ending it: 1. Governmental prohibition, which means forbidding any railroad to carry between competitive points below a certain minimum rate. And what legislature, State or national, will undertake to forbid a railroad from carrying as cheaply as it pleases? Or 2. By the stronger crushing out the weaker, resulting in a survival of the strongest only, if not the fittest. Is this the issue coveted? Or 3. What, in slang phrase, is called "pooling," and is advocated by such competent observers and long students of the subject as C. F. Adams, Jr., under the more dignified title of the "Federation of Railroads." The essence of this is an agreement among them for each to accept as its share of the competitive business, at a moderately remunerative rate common to all, what shall be judged to be its just proportion by an umpire or board selected by them all to make the apportionment. This is vehemently attacked by some. It is said to deprive the public of the benefits of competition. It has, however, only ended an extreme competition ruinous to all parties. Mr. Simon Sterne, in his great argument before the Special Assembly Committee versus the railroads, admits that it

¹ On this subject the writer advances no opinions not to be found in his article on the "Great Railroad Strike," in the *Presbyterian Quarterly and Princeton Review*, for October, 1877.

"has brought about a change for the better from that which prevailed immediately before the pooling arrangements were made" (p. 97). He insists that it "has been discovered in this country and England that competition was not the proper regulator of railway charges" (p. 104).

The several doctrines on this subject insisted on by the assailants of the proper autonomy of railroads, would either destroy them or greatly aggravate the evils of which they complain. Suppose that, first, there could be no stop or check to the internecine competition at Chicago, St. Louis, and elsewhere, and, next, that railroads must charge the same proportionate rates from all other points as from these. If they should continue the competitive through business, and do all other business at these ruinous rates, this would soon bankrupt and wreck them. If they discontinued the through competitive business, they would be obliged to charge higher local rates from non-competitive places than ever. Or, if this were impracticable, the road would sink in its condition, equipments, capacity for speed, safety, and accommodation far below what it is when great through trains help sustain and make profitable a more perfect road, and increased accommodations in every department. All places gain on the whole, even if any lose in some particulars, from the reinforcement of local with through business. They commonly have better roads, better tracks, better trains, and more of them.

In connection with the proportioning of railroad charges to the value of their services, the question of charging for carrying articles "what they will bear" comes in. This vague and elastic phrase has figured very odiously, and played an important part in late railroad controversies. It was employed in a joint answer of the presidents of the two great New York trunk-roads to the inquiries of the legislative committee as follows:

"The managers of a railway company desire to make all the money they can for their clients, and to do this they have before them the question, What rate, within their chartered limits, will an article bear that will yield the largest profit, and at the same time stimulate its production."

We have not struck upon the origin of a different twist of this phrase put in quotation-marks in the question of the New York Chamber of Commerce Committee, which professes to give

the true meaning of the doctrine on this subject of late sanctioned by authoritative railroad managers:

"7. Do you think it is safe to allow railroad managers to disregard the old theory upon which charges for transportation were based; namely, that they should be '*reasonable*' and based upon '*cost of service*,' and adopt the new theory which they have annunciated of charging '*all the traffic will bear*,' themselves being sole judges of this question?"

Yet the principle involved is so obvious that the framers of the question are constrained to admit it in the very document containing it. A page or two farther on in their Report they say:

"Of course the consideration of what the traffic will bear is one of the elements entering into the fixing of all rates for transportation, but to formally recognize the abrogation of a principle as great as competition is a step your Committee believe the American people are not ready to take."

Why, then, object to railroads considering "what the traffic will bear" in adjusting their tariff, if in the nature of things it must come in? It is impossible to exclude the value element of railroad service from the estimation of its proper price. To put it as the seventh question above quoted puts it, as if this were a new standard, excluding "reasonableness," consideration of "cost of service" and competition, is absurd. By their own showing it must be a great element in determining "reasonableness" of charges, and the necessity of it grows out of competition at least as often as anything else.

As to "abrogating competition" in transportation, it is impossible and undesirable. It needs regulation, not destruction. Like so many other things, within bounds it is an inestimable good; beyond these it becomes an agent of devastation and ruin, like an uncontrolled locomotive, or a fire let loose. Abrogate competition! As soon abrogate gravitation or the tides! There are forces that will and must prevent transportation charges from competitive points rising for any length of time above, if they cannot prevent their falling below, a reasonable standard. One is the great navigable water-courses from the interior, west, south, north, and south-west to the ocean. Another is the steady multiplication of new lines from the great interior railroad centres where agricultural products accumulate for transportation to the Atlantic and gulf ports. Now if from

great competitive points, which these new lines are constantly reaching, profits can be made at much lower rates than those now established by mutual agreement of existing lines, the new lines will immediately "cut under" them, in order to grasp a larger share of the business than they could be allowed in the pool. Here is competition. Not only so; but rates must be limited by the very nature of things unless the managers would limit and minimize their business. If their rates rise above certain limits, they raise the price of our products in foreign markets too high for export, and consequently cut off transportation for this purpose. This of such great entrepôts for distribution and transportation at home and abroad as Chicago, St. Louis, and Kansas City. But there is hardly a local town of importance on our great trunk-lines which is not pierced by competing lines, direct or indirect, to all important points, in addition to navigable waters in close proximity. Moreover, an undue tariff from any place of importance is sure sooner or later to bring competition, and to impair the business and patronage that would otherwise arise. If all these were abolished, the competition between cities would still operate. There are forces more certain and mighty than legislation that will keep alive all that is healthy in competition, especially so long as a general railroad law, now almost universally prevalent, confronts special charters and monopoly privileges.

The report from which we have just quoted proposes what is so often and loudly urged, that the people should "take every constitutional means to prohibit combinations and enforce competition;" as if the two were incompatible. We do not see how. Combinations are of two kinds; either of those which form parts of a continuous line, as the several roads between New York, Albany, and Buffalo, which were combined in one corporation, the New York Central and Hudson; or of those which go from one point to another by different routes, as the New York Central and Hudson, and the Pennsylvania, from Chicago to New York City. The former sort of consolidation it is about as easy, sensible, and advantageous to prevent, as it would be to turn the Hudson River into a series of separate levels by dam and lock for slack-water navigation. The vast gain in economy, speed, safety, profit of transportation to the railroads and the public,

from placing long stretches of railroad under one direction is too plain to be disputed. The progress of such unification can no more be arrested than the westward march of empire. Probably, however, it is the other form of "combination" that legislation is to be invoked to prevent; viz., an understanding between roads running from one competing point to another by different routes. It will take something more than legislation to prevent forwarders from the same place to the same place charging the same rates, and from having a mutual understanding what this rate shall be. Adversaries themselves being judges, this is far better for all parties than desperate and reckless competition.

But railroads are corporations, and corporations are the portents of the time, mightier than the people, and swaying an iron sceptre over them. Surely human depravity worms itself into corporations as well as elsewhere, and in all places in some proportion to the scope offered it. The question is not whether it shall, but how it shall least, infest all things human. But do those who are declaiming and raving against corporations really think themselves through to the logical outcome of such assaults? It is utterly impossible to harness the gigantic forces of nature to serve man, as steam is now made to do, without employing immense masses of capital for this purpose. Small capitalists are debarred from all possible participation in this kind of property, unless it is divided into shares capable of distribution and ownership in larger or smaller parcels, held and managed by a corporation. Otherwise these vast properties so necessary to the convenience, commerce, and productiveness of the country, must be exclusively the private property of single or few individuals. Is that the alternative so much coveted? Probably not. The outcry against corporations is an outcry not only against a few railroad magnates, but against the vast multitude of small owners, including widows and orphans and the prudent laborer whose savings are invested in them, whether they be railroads, canals, banks, mines, manufactories, steamboat companies, or whatever else. To hurl these catapults at corporations is but saying, either that the productive properties they hold shall be annihilated; or that they shall be owned by individuals, single or in partnership; or that they shall be owned by the State—from which latter condition we might

expect utter political demoralization and national bankruptcy. What are all the present "spoils of victory" in elections in comparison with a prize of \$5,000,000,000, now rapidly expanding to \$10,000,000,000? Where the carcass is, there are the vultures. Are not our river and harbor bills proof enough of this? And as surely as every Stony Brook or Buttermilk Falls now demands its appropriation as a condition of voting for appropriations for improving real harbors, will not every cross-road demand its railroad station as a condition of authorizing really national lines? Is it not pretty certain, too, that when other revenues for the purpose fail from exhaustion, the vacuum will be supplied by the indefinite issue of irredeemable legal-tender paper money—from all which may God deliver us! Demagogues are already proposing, as the watchword of future political campaigns, that "all privileges conferred upon corporations are rights taken from the great body of the people," and to "assail corporations and the officials who act in their interests," and "on this line to establish an aggressive campaign." Such people may light a fire. Any incendiary can do this. It does not follow that they can so easily put it out before it burns them out. Let this raid on corporations succeed in destroying them, and they may contend for other property tenures who will. They will doubtless get their labor for their pains. The great landholders will come next, and the smaller ones will quickly be drawn into their wake. Agrarianism and communism will luxuriate in the ashes of their own fires.

We may not ignore the fierce outcry against railroads as monopolies and extortioners. Judge Cooley says: "The word monopoly has an ominous sound to American ears, and whenever the appellation fairly attaches itself to anything, it is already condemned in the public mind" (PRINCETON REVIEW, March 1878, p. 257). Hence the eagerness with which the assailants of any kind of business, privilege, or property try to make it odious by hurling at it the epithets of monopoly or extortion. But in no proper sense are the railroads of the country monopolies. They are all exposed to the construction of competing lines, and it is only the fewest that have wholly escaped, and fewer still that will hereafter wholly escape competition. Most of the States allow the construction of railroads *ad libitum*, under general laws. In

others, special charters are freely granted when asked by petitioners able and willing to build roads. No vestige of railroad monopoly exists. To say that because people have only a single railroad near them, therefore this road has monopoly privileges, is like saying that cases of being near a single store, or craftsman, or hotel, turns them into monopolies.

Never was a truer sentence uttered than that of the late Dr. Chapin at some festivity in New York: "THE LOCOMOTIVE IS A GREAT DEMOCRAT." Nowhere, not even at the polls, are all more completely on a level than in the American railway-car, and that, too, in the enjoyment of advantages and comforts unknown half a century ago to the proudest monarchs, with thousands of chariots and horses at their command. But the steam-chariot cannot thus be a great democrat without being also, within due limits, a great autocrat. On his own road he must be sovereign. All else must give way and clear the track. Nothing must or can stand before him. One master-mind, too, must rule the whole road and its motors, or confusion and desolation come in place of those blessings which, rightly guided, with colossal might, he bestows on all. And yet, as with man himself, his unmatched strength is close to the greatest weakness. The endowments whereby man is a but little lower than an angel, in the very image of his God, make him capable of becoming a very worm, a brute, a fiend, "crushed before the moth." So, if the locomotive can move man and his products with a resistless energy and speed, a rotten tie, a loose spike, an unseen flaw, a mischievous boy, or senseless animal may get in its way, and, even if destroyed itself, precipitate it and its train to utter destruction.

We have uttered no uncertain sound in favor of regulated, and against reckless, competition. Not less than for other reasons we favor the "federation of railroads" in order to fix steady and fair prices for transportation, and prevent such evils, so far as they are due to this cause. Nor have we yet heard of any other mode of preventing these that would not bring in tenfold greater ones. But, as it is not possible that all evil can be utterly eliminated from competition, or anything else earthly and human, however beneficial on the whole, let us none the less do our best to minimize it. It is also worth while to remember

that fluctuation of railroad rates is, even at its worst, but one of many more formidable, yet unjustifiable, causes of such fluctuations, which are quite beyond the reach of legislation. We speak not now of those which arise from fluctuations of supply and demand, issuing from providential causes, such as the state, of the crops, markets, belligerent or peaceful relations at home and abroad, but rather of what is due to the voluntary interference of mischievous human agencies. Prices of the chief articles of railroad transportation are constantly forced up and down, not only to the prodigious risk and frequent ruin of dealers in these articles, but even to the taking of the bread out of the mouths, the life-blood out of the veins, of the poor and needy, and the stinting of the comforts and necessities of life for the average laborer. What are all the variations of railroad charges in their effects on merchants, shopkeepers, and the cost of subsistence to the people, compared with the "corners" produced by the great speculators and Napoleonic gamblers in wheat, pork, cotton, coffee, and the like, who seek to control the market, and, by monopoly prices, to enrich themselves through a forced levy on every consumer in the land? To wrench these out of the people by a turn of their speculative crank is to such men as light a matter as a snap of the finger. We notice names connected with this onset upon railroads for causing fluctuations of prices, of men who have alternately grasped millions and got mired in bankruptcy by such foolhardy tossing of the dice, to gain or lose all, in trying to monopolize and force up the prices of indispensable necessities or comforts of life. What then? Can legislation stop it? It has not been yet found how, without interfering with that freedom of contract which is one of the highest prerogatives of man, to surrender which is a degradation, to possess which is to possess what is capable of immense abuses as well as noblest uses.

Men are about Wall Street not only dealing legitimately in money and securities, but wielding money by the million, and tens of millions, for the sole purpose of so raising or depressing prices as may further their speculative movements. Nothing is more common than to loan millions one day upon call to tempt smaller speculators for a rising market, and to call it in the next day, or when it suits their purpose, so as to strangle the simple-

tons they have lured into their toils. This not only makes or ruins, helps or hurts, the neophytes who are scenting the Stock Exchange for the chance of finding a bonanza in the wake of the "great operators," but it tightens money and causes injury in every department of business, and nowhere more than in produce, groceries, and dry-goods. Can any legislation be devised to stop this which will not do far more harm than good? Even in the church, tares will get mixed with the wheat, often so that they cannot be rooted out without destroying the wheat.

Much is said of railroads revolutionizing the seats of trade and of special industries. There is no doubt of it and no help for it, nor is this any just ground of complaint, unless it be caused by what, all things considered, is partiality towards particular persons and places. It has been the effect of improved methods and routes of transportation and travel in all ages and countries. The Erie Canal pushed the great sources of wheat and lumber supply to the west of where it had been. The railroads have driven them still farther and yet farther west. This is inevitable. As surely as man will seek the maximum of utilities with the minimum of effort, he will use the railroads and steamships to this end when he can. What then? Has this destroyed or impaired agriculture in the Eastern or Middle States? Never. It has changed the form of it somewhat. But statistics show a great increase in Massachusetts and New York of the number of farms, the quantity, variety, and value of their products, nay, even a considerable advance in the amount of wheat raised in the Empire State. That some thin and exhausted farms should be abandoned or pass into the hands of foreign-born laborers now become capitalists is a matter of course, railroads or no railroads. To complain, as some do, that one cannot be sure that the business-place he buys in New York now may not be less suitable and valuable five years hence, and lay it to the charge of the railroads, is puerile. It is hardly forty years since the average New York merchant felt that he had made the surest provision for his family if he left them stores in Pearl Street, then the centre of dry-goods jobbing. This has since crept up Broadway and cross-streets, till it centres around Franklin Street, while Pearl Street property is relatively second or third class. Scarcely a generation has passed since the Astor

House was the leading hotel, without a rival above City Hall Park, and considerably less than half a century since it was built. The railroads are responsible for this only as they are responsible for the growth of the metropolis.

The question of limiting the earnings or dividends of railroads has come into some prominence in connection with these discussions. This cannot be of great moment as long as the average dividends of the railroads of the country are about two, and in the most favored States ordinarily only three, per cent on their capital.¹ Of the great trunk-lines, the Erie with its enormous earnings is, and always has been, saying nothing of the future, far enough from any dividends from earnings. The Pennsylvania had to suspend them for years, and the Baltimore and Ohio at various times. Mr. Hepburn, Bank Superintendent of the State of New York, says, in his recent report, that in the State of New York, "excluding leased lines, there are only two railroads, the New York Central and Hudson, and Boston and Albany, that for five years past have paid consecutive annual dividends amounting to five per cent each."² As to the leased lines, the lessees, with a single exception, to the best of our knowledge, altho ranking as wealthy corporations, have paid no, or next to no, dividends for nearly the same period. Now as to profits, New York railroads stand high, on the average, in competition with those of the entire United States. The risks, therefore, of railroad investment are something tremendous, arising from various sources: the frequent lack of remunerative business; the liability to lose it through the construction of competing lines; the exposure to all sorts of destructive casualties from fire, flood, tempest, collisions, flaws in rolling-stock or rails; the neglect or forgetfulness of servants, in all of which the railway company, i.e. stockholders, must indemnify for losses and injuries, sometimes of prodigious magnitude, consuming profits, and even bankrupting roads. At best there is the constant exposure to new and competing roads which may render a property, before valuable, utterly or comparatively valueless. The risks are therefore immense. All losses must be

¹ See "Railroads of the U. S.," by Edward Atkinson, p. 29.

² Supplement to *Com. and Financial Chronicle*, Feb. 1881, pp. 1, 2.

borne by the stockholders first and creditors next. Must the shareholders be cut off from all chances not only of fair interest upon the capital invested, but even of generous profits in the very exceptional instances in which rare opportunities and management may honestly yield them? If so, this is unlike any business. Capital will instinctively be shy of it if it must bear the most unlimited losses, with no chance for the gains when they are handsome. In point of fact the cases are few in which railroads have averaged six per cent from the first; fewer still that have averaged eight. Most roads now solid and paying handsome dividends for years paid none. On the other hand, many roads once dividing ten per cent have come to divide nothing. As to stock dividends, in slang phrase called "stock-watering," if they represent earnings applied to the improvement of the road rather than to dividends when earned, what can be more just? If made on no such basis, they are only the company's choice as to number or form of shares.

As a general principle, we doubt the policy of restricting the earnings of railroads by legislation. We think prosperous railroads a far greater blessing to the community than bankrupt, starving, or poorly paid ones. They are more likely to keep up and advance their roads to the highest state of speed, safety, commodiousness, in order to keep and increase their business, by cheapening its cost to themselves and the public, while they increase its quantity. Thus only can they withstand competition. Thus only can come the substitution of steel for iron rails; of heavy rails for lighter ones; of heavy for slender ties; of broken stone for ground ballasting; of a double for single track; of a triple or quadruple for a double track; of stone or iron for wooden bridges; of crossings above or below other roads instead of at grade, or, where this is impracticable, the substitution for it of gates and flagmen; the increase of terminal facilities so necessary and yet so costly in our great marts of trade. A railroad is never completed, and the further it is perfected in such a way as to lessen its risks and the danger to those who use it, to cheapen and expedite its service, while this is responded to by an increase of business that warrants and takes advantage of it, the better for the public and the road.

So statistical tables show on the great-trunk lines a constant

growth of business, at constantly decreasing rates and charges, and a gradual increase of profits, until their charges have fallen a great deal below a cent a ton per mile. Yet they are able, by means of their economies and improvements, to make money now at rates that would have bankrupted them a few years ago, and would now bankrupt them upon a small business. Who believes that any such result could have been reached under any conceivable system of State management ; i.e., management at the behest of politicians dependent on universal suffrage for their places and opportunities of emolument ? For, after all, it will turn out that those who control the votes which lift political parties to the ascendancy will for the most part have the places at their command. And it is one thing to regulate railroads or any other business by selecting for service persons because they can command votes, and another by selecting them on account of their pre-eminent fitness for the position they fill. Gen. J. H. Devereaux has been recently reported as saying :

“Tonnage is so heavy that the difference of the small sum of one mill per ton makes the difference of a dividend or bankruptcy. On my road it makes something like \$400,000 difference, while on the New York Central, I do not hesitate to say, I think it makes a difference of \$2,000,000.”

Think of that, and think of the legislature attempting to fix a tariff. It were better occupied splitting hairs, or seeking Captain Kidd's treasure. The fact is, had it undertaken any such function in the past, the economy of railroad transportation never would have reached this “fine point.” If the New York Legislature prohibits “discrimination” charges on the railroads no more than it does on the canals it owns, they have not much to fear in this way. It is stated that the Canal Board has abolished all tolls on west-bound traffic—but that it discriminates against all salt made out of the State ; doubtless in the interests of the farmers and butter-makers on its line and beyond, who could well afford to quadruple railroad freights if they could thus expel counterfeit butter from the market.

The railroads have received their charters from the States. They are subject to the police regulations of States ; to State taxation ; to the principles of common law applicable to them as common carriers or otherwise ; to such statute laws of States

adapted to their special peculiarities, with respect to these matters, as may be found necessary and involve no violation of their charters. But they are entitled to the unimpeded use of the privileges granted in their charters, short of manifest abuse. This cannot be interfered with without violation of that clause of the national constitution which forbids any action by State authorities impairing the obligation of contracts. And for reasons already adduced, we do not think the exercise of the State power to interfere by statute with railroad tariffs ordinarily expedient, even if its existence were unquestioned. No clear judgment in respect to this power, so far as we knew, has yet been given by the U. S. Supreme Court. That given in the granger cases related to roads in which the States reserved in the charters given the power to change them at pleasure. It has no reference to charters not thus conditioned. But the experience of the effects of this granger legislation and its like everywhere has led to its substantial abandonment, as hurting not only the railroads, but still more the people.¹

What is known as the Reagan bill in Congress reported from the same committee as the River and Harbor bill, by Mr. Reagan as chairman, would be vastly more mischievous than the granger legislation of the North-west. Several features of it are obnoxious; such as making a "car-load the unit," prohibiting pooling, enforcing the same proportional rate for one as any number of such loads, and applying criminal penalties for charging more than reasonable rates without clearly defining what is a reasonable rate. This is a very different thing from a railroad being answerable in damages for charging unreasonable rates, the

¹ "Wherever State control or ownership has been attempted, it has failed to promote cheap railway service. The history of the Tunnel and the Hartford and Erie legislation, when fully written, will be marked not only by their utter failure in securing the objects aimed at, but by corruption and fraud, by the subornation of legislators, by the prostitution of the powers entrusted to the senators and representatives for private ends, and even in the very last session by the open surrender of the interests of the State to the supposed requirements of the private clients of legislators." (Atkinson, p. 28.) See also that bright book, "Chapters in Erie," by C. F. Adams, Jr., for still more terrible legislative and judicial prostitution in lending support to plunderings of stockholders of railroads, on a scale of enormity to which civilization furnishes scarcely a parallel. Let the eight-hour laws of Congress, the New York capitol, the New York City court-house, the canal rings, the street-cleaning of the city, the pilot monopolies, convey their own lesson on the management of railroads by politicians.

courts being judges of all the circumstances in each case which make them reasonable or unreasonable. But our objection to this national interference lies deeper. The general question of trenching on the prerogatives of the States aside, we believe this whole pretension is *ultra vires*, beyond the scope of national power over interstate commerce. So far as we know, this power has never been exercised, even if it has been invoked, to determine the prices of interstate transportation. It was, we believe, never conveyed for any such purpose in our national Constitution. It has been exercised chiefly, if not wholly, to remove obstacles interposed or permitted by the States to free commercial interchange between them, or between this and foreign countries. Can the national government, under pretext of regulating interstate or foreign commerce, say what carrying vessels and steamers on the Ohio, Missouri, Mississippi, the Delaware, the Atlantic coast, across the ocean, shall charge for passengers and freight? If they can, the power is merely theoretical, which may as wisely be exercised as the power to secure the importation of wheat into the United States, if such power exists. We have a still deeper aversion to this from the practical side, for reasons so well stated in the answer of the Massachusetts Commissioners to the Chamber of Commerce committee, which our limits prevent us from quoting. It proves that all present evils connected with railroad management compare with what would grow out of congressional supervision, as ant-hills with mountains.

There is, however, one danger to our channels of interstate communication by railroad with which the power of the national government is alone adequate to cope, and which it ought effectually and promptly to prepare itself to meet. We refer to the violent stoppage of these arteries of the national life by strikes, mobs, and riots, of which the great railroad strike of 1877 gave us dire experience and ample premonition. The days and weeks in which violent men stopped the interflow of commodities between the interior and the seaboard amounted to a reign of terror, and showed us how quickly it could not only arrest foreign and domestic commerce, but precipitate a famine. We know not how soon this may occur again. The last two commercial panics (in 1857 and 1873) were precipitated by sinking immense amounts of capital in unproductive railroad-building.

This process has commenced already. Brokers are, as we now write, offering 6-per-cent gold railroad bonds at about 90. General Devereaux predicts a speedy crash. We trust it is not near. But come in due time it will and must, necessitating that lowering of wages which is sure to be resented by strikes. These might be borne if other workmen were allowed to take the strikers' places. But that is resisted by violence, else the strikers are baffled. Now here is the time and place for the national government to intervene with its fullest power; to insist that these arteries of interstate commerce shall not be cut, and to protect the liberty of all to work the railroads without molestation, by grapeshot and cannon-ball if need be. Was it not humiliating, in 1873 that this great nation was disabled by mobs and ruffians from carrying its own mails with punctuality and regularity? And are any wire-drawn theories about overriding State rights again to fetter and disable the nation from defending its own life and property in mob-beleagured States?

We will only add that laws are needed to prevent fraud on the part of projectors and managers of railroads, by which they dishonestly tempt the ignorant and unwary to sink their savings in mere speculative enterprises, or by which the stockholders in good railroads are unwittingly stripped of their property for the special behoof of the managers. Railroads ought seldom, in our judgment, to be allowed to create a bonded debt or advertise bonds for sale not backed by something like an equal amount already expended on the road, or its equivalent in lands as security. Rarely, if ever, should railroad managers be allowed to buy, lease, or otherwise get control of a connecting or parallel road with the funds or on the responsibility of the original road, without sanction of the stockholders first obtained after due notice. Many roads have been weighed down by onerous leases of this kind which have inured to the benefit of managing rings at the cost of the stock- and bond-holders. We believe that due publicity here as in regard to rates of transportation, and all the rebates and drawbacks heretofore too often kept secret, would prove the sure and adequate remedy for the evils that have furnished any serious ground of complaint.

LYMAN H. ATWATER.

ON THE SO-CALLED SCIENCE OF RELIGION.

THE comparative study of the non-Christian religions has, as every one knows, become in recent time a prominent subject of public attention, and is likely so to continue. It has even been ticketed with the name of a "science," in accordance with the fashion of the day—or, it may be said, with the intent of claiming for this department of investigation a breadth of basis, a strictness of method, and a certainty of attained results analogous with those of other departments commonly called by the same name. As to whether the claim is well founded opinions will, and with good reason, differ; yet many who now regard the title as at the best prematurely assumed will allow that the study may, if successfully conducted, grow into the proportions and solidity of a science. In any event, it is desirable to see what are the fundamental views held, rightly or wrongly, by those who are devoting themselves to the science; and to set these forth, as looked at from its own point of view, is the object of the present paper.

The new "science" is an inseparable part of the study of pre-historic man, of the origin and development of his culture, his knowledge, his institutions, and his arts. Its nearest affinity is with the modern science of language. The analogy between the two is so close that the one is constantly called in to illustrate the other. Almost every student of general language is drawn over perforce to investigate the history of religions also; and in popular opinion (especially among English-speaking peoples) the same authority is even credited with the establishment of both, and with just about as much and as little reason in the one case as in the other. Beliefs and practices such as we call religious are as widely found among men as any of the other ordinary

constituents of human culture (whether they are to be deemed universal is a point considered further on); and the method of their fruitful study must plainly be, like that of all the rest, a comparative one: the widest possible collection and co-ordination of facts, with careful deduction of general principles and determination of causes. There can be no successful investigation of any part of man's historical development in any other way; we are too much the creatures of habit and of the prejudice engendered by habit to comprehend the character of what we ourselves possess, or to see how we should have come into possession of it, save as we set it beside the kindred possessions of our fellow-men.

It has been till recently, and is still to a considerable extent, the prevalent assumption that the universality of religious phenomena among men could have no other ground than a primitive revelation of some sort, a miraculous communication to the ancestors of our race of a certain amount of absolute truth respecting the unseen world and man's relations to that world, which truth has been variously lost and disguised and corrupted, till in place of it have come the systems, ranging through every conceivable degree of falsity and degrading absurdity, which we find to have actually existed in the earth since the first beginning of historical record. If this were true, the task of a science of religion would be to determine the amount and character of that primitive revelation, and to demonstrate in human nature and human circumstances the reasons of so signal a disappointment of the purposes of the revealer in making it. This would furnish sphere and occupation enough for the scientific student.

But it hardly needs to be pointed out that the whole tendency of modern scientific thought is opposed to the passing of such an assumption unchallenged. It seems a part of the old *frée-and-easy* system of accounting by a miracle for anything that seems difficult of explanation; and that system has long been tumbling to pieces, undermined by historical research. Until within a comparatively short time, it was questioned by no one that the earth was turned out of hand a few thousand years ago, called up out of nothing as a ready-furnished abode for men, with a firmament of heavenly bodies revolving about it for his convenience and pleasure. At present no cultivated

person holds any such view ; we recognize the action of secondary causes, operating through immense periods of time, as finally bringing about the state of things with which we are familiar—the last (so far) of a series of states which were very different from it and from one another. An example of closer application is presented by language : the doctrine was formerly current that a ready-made vocabulary and grammar had been put into the minds and mouths of the first human beings by a super-human agency ; and that variation, not unaided by miraculous intervention, of that original tongue had resulted in the infinity of dialects now existing. But the students of language have come to see clearly that men as they are, with the natures implanted in them and in the circumstances by which they are surrounded, not only might, but certainly would, work out by the normal exercise of their powers means of expression and communication such as we now see them possessed of ; and that the origin and history of speech are thus completely accounted for by causes which we are accustomed to call natural. This explanation is not yet so universally accepted as is that of the geological history of the earth ; but only because it is newer, and deals with considerations of a less palpable, physical order : no well-informed and candid man will question that the evidence in its favor is capable of rising to a degree of force that shall be practically irresistible. Nor is the case far different with the other institutions of our race. Every people that has risen high enough in intellectual curiosity to speculate on the beginnings of its culture has attributed them to the direct agency of its gods, unable to understand how they could otherwise have come into being at all ; unable to conceive of primitive man as set down in the earth naked and weaponless and destitute, and yet endowed with powers by whose gradual training and exercise he should win the forces of nature to his service, and gain command of a wealth and knowledge whereof we do not yet see the limit.

Now it seems evident to the modern students of man's history that the same question has to be raised respecting his religious institutions that has been already raised and in good measure answered respecting his languages, his organizations of society, his arts, and the rest. We must at any rate look to see

whether there is anything in ordinary and universal human nature that should necessarily lead men to the discovery of religious truth, or of what they take for such, to the formation of a body of beliefs and of practices incorporating those beliefs. That is to say: men being such as we perceive them to be, and their circumstances such as we know them, are the great mass of the religions of the world to be accounted for as results of the normal exercise of men's faculties under government of the usual motives to their exercise? If such is found to be the case, the scientific study of religions wins a very different basis; indeed, we may even claim that it for the first time finds a solid basis at all. For the miraculous is no proper matter of scientific investigation. This can be carried on only in the way of observation and comparison; and a miraculous intervention neither comes at present under the ken of the student, nor is admitted by him in the past for any department of man's development save the religious. If, on the other hand, we have within our reach the whole material of study, with all the forces whose action is to be allowed for, in human circumstances and human nature respectively, the problem is a truly scientific one, like that of the origin of language or of the solar system, and capable of such solution, more or less complete and detailed according to their inherent difficulty and our command of the necessary data, as scientific problems in general admit. The use, then, of the name "science" of religion, or of anything equivalent to it, implies that there is believed to exist in observable human nature something which regularly and inevitably leads to the formation of religions. And such is the firm belief of those whose views we have undertaken to set forth. As things now are, a religion of some kind constitutes a part of every existing form of culture, and is handed down to each inheritor of that culture—like, for example, his language; but if we could suppose them all torn up to the last rootlet and flung away, something like them would (we cannot tell in how long a time) spring up to take their place, and that without any superhuman aid. How much of absolute truth would be in any or in all of them is another question. The Christian believes that only by an auxiliary revelation could the rooted errors of every heathen

belief be destroyed, the actual origin and destiny of man made known, and the successful practice of righteousness assured; and it involves no relinquishment of this belief to admit the natural and necessary growth of such reachings-out after the truth as religions of the origin just assumed would be, or as those are which are now seen in existence outside the pale of Christianity.

But what is the faculty or tendency in human nature working toward such an end? To call it a "religious instinct" will not help us much: any more, in fact, than the assumption of a linguistic instinct to explain the formation and use of language, or of an architectural instinct to explain the building of shelters, from the ice-hut of the Eskimo to the palace of the European noble. The application of the word instinctive at all to the productions of human intelligence amounts to a confession of inability to say anything in explanation of them. We recognize instinct in the song of the solitary cage-reared bird, precisely agreeing with that of his kindred in field or forest; or in the dam-building of the tame beaver in his waterless hutch; but man's way of working is by the slow process of observing and comparing and deducing and applying means to ends—a process of which, when his powers of reflection are developed by culture, he can give a reasonable account to himself. Beavers' dams are practically alike, wherever set up; but religions are as unlike as buildings; and an instinct or special faculty producing them all would certainly admit of an analysis that should leave only a minimal residuum for the pure unalloyed product of the faculty itself: the differences between religions are many times greater than the difference between certain religions and nothing at all. Of still less use, if possible, is it to trace religion to a desire to "apprehend the Infinite;" nor is it easy to see how one should imagine that by such a *dictum* is contributed any aid either to the theoretical comprehension of religion or to the explanation of its origin. It reminds one of nothing so much as of the wisdom of the Sunday-school orator who, having let fall the word "abstract," immediately added, "You will understand that by an 'abstract' I mean an 'epitome.'" Or it is as if one were to ascribe language to a yearning to incorporate the incorporeal, or

instruments to a tendency to enslave the energies of matter. Such indefinite and high-sounding phrases are only a cloak to hide poverty and indistinctness of thought.

No one will deny that the object of religious inquiry, in all ages and stages, is to learn something about the Maker and Governor of the world, and our relations to him: the question for us to solve is, What should lead even unenlightened men to enter upon such a far-reaching and difficult inquiry, and what should put into their minds the answers with which they strive to satisfy themselves? The solution lies so near at hand as not to have been missed except by those to whom a simple solution is no worthy one. Before and around all men alike are spread out the works and ways of the creation, in which, if anywhere, the nature of its creator is to be read. If we take any other than the transcendental view, asserting that we know only our own existence and states of mind, if even those, we must hold that man is in his most essential character an intelligent being, capable of being impressed by those processes of the external world which communicate themselves to him, of apprehending them, studying them, reasoning upon them, and adapting himself, actively and passively, to them. If there is a Creator, it is the simplest thing in the world that men should gain from his works some knowledge of him, and ever more and better. But, also, if there be none, or none of whom we can have any real knowledge, men, on their way to the recognition of the fact, will postulate one, and give him form and attributes, in a series of successively amended incorporations, until the error of even the last and best of these shall be finally discovered.

The intellectual agency at the bottom of the process, efficient equally in the unenlightened and in the enlightened stages of human development, is the simple faith in the connection of cause and effect, the belief that behind every effect lies a cause, which is to be sought and may perhaps be discovered there. That such a belief is firmly established in the mind of every human being is universally allowed, tho as to how it came there there is plenty of dispute, some regarding it as an intuition, a part of the very structure of the mind itself, while in the view of others it is rather an article of mental furniture, an immovable fixture, a deduction from experience, which shows so widely and

constantly that one thing proceeds necessarily from another, and that a thing is because something else has preceded and led to it, that we generalize it into a universal rule, of which the sway grows firmer with every new experience of necessary sequence. On such points opinions will probably always be at variance, according to the character and training of those who form them (a certain American metaphysician of no mean repute holds even that the law of gravitation is an intuition); but so far as our present purpose is concerned the variance is of no account. The truth that we need is one conceded by all; namely, that men, even the lowest, will look for a cause or causes behind those events of external nature which concern them, and will find or imagine one; will frame a theory to explain whatever they regard with interest. Every race that has risen above the very lowest cares of provision for continued existence has some sort of a philosophy, or theory of the universe; and, as a part or aspect of this, a religion. The philosophy is the more comprehensive thing, including the religion; but the latter is the more practical and urgent, and apt to outgrow and overshadow the other. The philosophy is a matter of curious inquiry; the religion, one of absorbing personal interest. How it comes to be superadded we have now to go on and ask.

In the first place, as the problem of explanation of the phenomena outside himself must inevitably arise in the mind of man, however primitive and untutored, so the solutions he devises will as inevitably be anthropomorphic, and for the simple reason that he can form no distinct conception of anything of a different character. To him, he himself and his kind are the active and efficient agents whom he knows and knows best—agents that can devise and make, that can form a plan and carry it out. Accordingly, behind the effects of nature he conceives a set of more or less manlike effecters—beings endowed with will and the ability to execute it; of superhuman power, because their works are on a scale of grandeur far beyond the measure of man's abilities; undying, because they act on and on without cessation; invisible, because they are only perceived in what they do; but endowed, if the vivid fancy of their believer gives him sometimes glimpses of them, with a form resembling his own: in short, magnified and intensified human beings, with

only such variations and additions as the imagination working on a human basis may suggest. All the occurrences of nature are paralleled with human proceedings: the wind is blown breath; the thunder-storm is a battle; the sky looks down at night with innumerable eyes; the earth is a mother, bringing plants and animals to birth when fertilized with showers of rain by the heaven-father; the sun rides up the sky; he shoots burning arrows at the earth; or he is born in the morning out of the bosom of the night and dies again at evening—and so on in endless variety, which it is needless to attempt here to illustrate.

There follows from this a corollary, which may well enough be at once noticed: No religion having a natural origin can be otherwise than polytheistic. The variety of effects to be accounted for leads without fail to the assumption of a variety of causes. The power to penetrate this variety and discover beneath it an essential unity belongs to a later and higher stage of development. A theory of primitive monotheism suits well enough with one of primitive revelation, but with nothing else. This seems so clear as to call for no labored argument to sustain it. And the facts of religious history are wholly in its favor. No trace of monotheism is to be found anywhere in the world except with a polytheism behind it: witness the Semitic polytheism out of which issues the Hebrew, and later the Mohammedan, belief in one god, or the Aryan polytheism underlying both the dualism (if it is fairly to be so called) of Zoroaster and such philosophic unity of creator as Hindu sages of the later time have sporadically come to hold. Where the contrary of this is sought to be discovered—as, for instance, by some authorities, in the Vedic hymns—it is only by an inversion of the true and obvious relations of things, and by other fruitless straining of facts to sustain an untenable theory.¹

¹ That there is room, beside these two fundamental varieties of religion, to set up a third, a "henotheistic," as has lately been done by Müller and some of his imitators, is by no means to be conceded: the so-called henotheism is a purely individual phenomenon, of the most subordinate consequence. A henotheist is one who, while fully and constantly believing in a variety of gods, yet cannot refrain from ascribing to the one whom he is at the moment worshipping more than the strictly due share of power and prominence in the system. Any one who keeps a fetich or carries an amulet is as much a henotheist as is a Vedic poet; or, for that matter, whoever acknowledges a patron-saint.

So far we have noticed only the philosophic factor of belief: the mere recognition of extrahuman and superhuman powers under anthropomorphic forms is not yet a religion. But the other factor follows this by a necessity. Anthropomorphism is internal as well as external; it extends to character and motive not less than to shape and mode of action. The manlike beings who wield the forces of nature have also the feelings and passions of men, the disposition to do good and to do harm, and the capacity of being propitiated. If men could hold on their own independent way in the midst of nature, careless of what happened about them, their philosophy would never grow into a religion. But that is far enough from being the case: the supernatural powers are all the time interfering for good or ill with the concerns of man; his whole happiness is at their mercy; they send down upon him alternately blessings and calamities; causes outside both of himself and of his fellows are either frustrating his best plans or furthering them to a successful issue; and this he must attribute to the favor or disfavor of those whose will he regards as expressed in such influences. Propitiation must be attempted; if possible, one must ingratiate himself with the unseen beings whose benevolence is so important to him; or he must deprecate the malevolence they show. Hence follow two results of the highest consequence. In the first place, the practice of sacrifice and offering, which is a feature of every known religion: offering of property, deemed valuable to the divinity because it is valued by the offerer, and in every kind, from insignificant trifles up to animal life, and even that most precious article, human life; offering of whatever may be in other ways costly to the worshipper, as labor and penance, fasting and vigil, mutilation and self-torture; and, where the religion rises to a higher and more spiritual strain, offering of homage, of praise and of prayer. In the second place, the practice also of such conduct as will be pleasing to the superhuman powers. And what that is the anthropomorphic rule, of course, determines. Whatever is held by the man himself to be good and desirable he cannot but regard as acceptable also to the divinity. Religion thus re-enforces conscience, and adds a new sanction to the feeling of duty. The thing which should be done wins a greatly enhanced authority, as being demanded

by those under whose direction is the government of creation. Man makes himself and his conduct in this way a part of the general order of things: with what important effect is too obvious to need to be pointed out. This is the highest and the most elevating aspect of religions. They gain a moral element, and become furtherers of righteousness. The ideal of morality set up by different religions is, to be sure, a very various one, and often low enough; it cannot, in fact, but correspond to the grade of enlightenment of the moral sense reached by the votaries of each faith; but it is never altogether wanting, and it acts everywhere as a quickening and purifying influence; in devotion to religion is found in general the highest virtue and the fullest self-abnegation of which individuals in a given community are capable.

We are prepared now to lay down what may be called a historical definition of a religion, one representing its character as a historical development, taking due account of the elements that go to make it up, and applicable to any and all, whether the amount of truth contained in them be greater or less. A religion is the belief in a superhuman being or beings whose actions are seen in the works of creation, and in such relations on the part of man toward this being or beings as prompt the believer to acts of propitiation and worship, and to the regulation of conduct. It is a philosophy with the application to human interests added; and not only added, but, as could not well be otherwise, made the prominent consideration: for man is everywhere ready enough to regard himself as the highest of nature's works, and to believe everything else made for his use and behoof; and, even if this were not so, his own destiny and what bears upon it is to him the thing of most consequence.

It will be clear from this why the question as to the universality of religion is a real one, and liable to different answers even from those who have the same, or nearly the same, facts before them on which to found an opinion. For there is nothing absolute about the presence or absence of religion in a certain culture, as there is, for example, about that of oxygen in a certain compound. It is a matter of degree; and hence the question of fact is in part also a verbal question: Are we justified in giving the name of religion to what is so little, or to what is so

low? As regards the quantity, it seems certain that, whatever we may deem possible in the very initial stages of cultural development, no race of men has ever been actually met with which had not arrived at some body of views, tho of only the most indefinite and shadowy character, respecting the forces—that is to say, the beings: for in such a mental condition the one is the necessary form of the other—expressing themselves in the phenomena of nature; the germs of a world-philosophy are everywhere to be met with. That might be, however, without excluding the possibility that the feeling of relation between the extra-human forces and human beings which leads to acts of propitiation should be nearly or altogether wanting. Such a deficiency we call a lack of religiosity, or of the religious sense; and we see that it can be traced to absence of imaginativeness or of fervor of disposition on the part of certain communities, as on the part of individuals in any community. But that it is ever so complete in a whole race as to occasion a total absence of practices that may be denominated religious is not generally believed. Religious institutions are held with probability to form some part, if only a minimal one, in every scheme of culture, however elementary, that has yet been brought to light.

A much more serious question is this: How broad and deep are we to draw the line between religion and superstition? That in their origin and essential nature they are alike is not to be denied. Both include a recognition of the supernatural, and a desire and attempt to win it over to the furtherance of human welfare. The distinction between them appears to be one of degree, and yet the difference in their tone and spirit is so great, as also in their effect on the human mind and on human culture, that we are naturally loath to give the nobler name to the more ignoble and degrading thing. We may also fairly say that the modern agnostic philosophy is bound on the same general errand; it, too, is searching after the hidden forces of universal nature, and striving to make them subservient to man's interests, as well as to his craving after knowledge; and it is of high importance to note this pervading analogy in men's dealings with the extra-human, from the very beginning through to the end. But, as the last of the three has succeeded in eliminating the element of a religion altogether from its belief, must we say also

that the first has not reached the height of a religious belief? The surface distinction between religion and superstition is obvious enough: the former looks up, the latter looks down. A religion has gods, whose worship does at least something to idealize and exalt the worshipper. A superstition is rather the incorporation of cringing terror; its gods are omnipresent evil influences, its rites are magic, and its priests are sorcerers. The lowest and most synthetic form of recognition of the supernatural is fear of the dark; it is almost to be called an instinct, and is universal among those who are childish, in years or in development. It is not the mere feeling of helplessness when all that capacity of defence that depends upon sight is taken away; there is in it the element of the uncanny, an overmastering dread of unseen hostile powers. That which in the lowest races takes the place of religion is hardly more than an expansion of this feeling into an infinity of details, and an attempt by magical devices to establish such relations with the hostile powers as shall enable one to ward off their malevolence from one's self and turn it in the direction of others. An anthropomorphic conception of the forces of nature is as clearly traceable here, and as much the fundamental and determining element, as in the religions of a higher stage. But another anthropomorphic element is also very widely found in such beliefs; namely, the interference of disembodied human souls. It is astonishing how generally, in every stage of culture, men have been unable to believe that death is the last of a man. Races are the rare exceptions who do not hold, with greater or less distinctness, that those who have left this life are transferred to some other condition or place of being, and retain, at least some of them and at least for a time, their identity and the interests and dispositions that belonged to them in life. The more conspicuous illustrations of this are in every one's mind—the happy hunting-grounds of our Indian tribes; the Valhalla of the Norse warrior; the Hades of the Greeks; the resort to Yama, first semi-divine progenitor of the race, by his descendants and followers, which was the simple old Vedic belief, afterward altered into a series of heavens and hells, and still more into a system of universal transmigration, for the later Hindus; the ancestor-worship of the Chinese, strikingly akin with the Vedic; and the belief, obviously underlying

the funeral rites of the ancient Egyptians, that death is a transition state, paralleled with the underground nightly course of the sun; and that, if the right means are used, the personal identity may be indefinitely maintained, until the time of awakening shall arrive. The impressions under government of which, without the aid of any revelation respecting another world, this doctrine of existence after death grows up, assuming such variety of form, have been often set forth: inability to credit the complete stoppage, often suddenly and in mid-career, of so high an activity; the analogy of the deathlike, but only temporary, condition of sleep; dreams and visions, in which the dead are seen as if still living, or in which distant and strange scenes are visited by the sleeper; and other the like. The lowest and most superstitious form of the doctrine is the simple belief that the dead come back again and mix themselves in the affairs of the living, for good or for evil, but, in accordance with the cringing character of this stage of faith, especially for evil; accompanied, of course, by the further belief that they can be called up and their action controlled and directed. And this mixture of the post-human with the extra-human is capable of being carried so far that the distinction of the two becomes evanescent, and the spirits of the departed and the hostile spirits that are threatening harm to men from behind every natural phenomenon are well-nigh or quite identified. The whole class of doctrines belonging in this lowest stratum, and in which this peculiar kind of anthropomorphism has blurred the line between the human and extra-human, has for some time past gone by the name of "animism"—a successfully descriptive and useful designation, provided we do not suppose ourselves to have explained by it the nature of the system, or fail to resolve its varieties into the action of their determining causes in human nature, and of the same causes which have given birth also to the religions of higher class.

Since low superstitions of the kind we have been noticing seem to be characteristic of a stage of intellectual development, the inclination is strong among students of religions to regard them as historically the antecedent and foundation of whatever is higher; or, rather, to assume as underlying the polytheistic religions a condition of belief in which there was nothing better,

nothing more definitized and clear, than in the forms of animism; for some of these have worked themselves out into such a complex of degrading and disgusting practices that the possibility of their development by internal forces into anything more elevated seems excluded; the ground they occupy is barren of good until cleared of them by some destructive process. But no religion is free from admixture of superstitious and magical elements; not even professed acceptance of the very highest can banish from men's souls all allegiance to practices that belong to the lowest. Devils and demons continue through all changes of faith to be the anthropomorphic solution of the problem of evil; the practice of witchcraft was forbidden, not its possibility denied, in the most enlightened communities of the world down to almost our own time; and lucky and unlucky times and acts, and the evil eye, and amulets and consecrated rosaries, and so on, attest even now the almost insuperable difficulty of rooting out of the mind those persuasions which have been from the beginning of time the source of false religions. Religion alone is not equal to the task; only under the added influence of physical science, which draws with sure hand the boundary-line between the human and extra-human, and substitutes a philosophic for a magic control of the forces of nature, does witchcraft lose all its power and disappear, simply because it no longer finds any credit.

Our general conclusion, then, must be that the question where, in the continuous development of men's inferences from the phenomena of nature respecting the forces that move nature—that is to say, of their philosophies—the element to be distinctly called religious comes in, as well as where it goes out again, is mainly a question of the division of things that pass into one another by insensible gradations and are mixed together in varying proportions; and so that it is a matter for reasonable difference of opinion, and of only subordinate consequence in comparison with our recognition of the unity of those tendencies in human nature, acting under the impulse of human circumstances, which produce the whole course of the development. The number and variety of beliefs and practices in the sphere of religion is infinite, and in their details a subject of extreme difficulty to deal with; even as the number and variety of men's

languages, and of the formations and combinations which these contain. In them are incorporated all the differences of men's capacities and dispositions, working themselves out under all the differences of external conditions mixed with conditions of historical sequence. They may be found set forth more or less fully in the many descriptive works on the heathen religions which have appeared in recent time; we have no room here to exemplify them, even briefly and in the way of illustration.

It follows from the views here taken that there would of necessity grow up, in every primitive community that was homogeneous and held together long enough, a certain body of common views of the system of nature, with the consequent admixture of a religious element, or of what did duty as such, finding expression in words and acts and institutions; and that these would be handed down by tradition, changing as they went, like other practices and institutions. Now, of all traditional institutions, the language of a community is found to be, on the whole, the one that cleaves closest, leaves its traces longest, and yields the most accessible and the most trustworthy evidence. There is nothing else which discloses so much respecting the existence and fates of those early communities which were in great part races also, and apart from which, at any rate, we shall never know much about the ancient divisions of humanity. If, then, we discover in language evidence of the former existence of a unitary community which has spread and branched and scattered until its dialects have come to occupy a considerable part of the earth's surface, we shall have no doubt that it possessed before its dispersal a common religion, of which traces may be expected to be found in the various beliefs of those among the now separated branches which have not in the mean time undergone a religious revolution. Every one knows what is the most conspicuous and important illustration of this truth that has yet come to light: the establishment on the evidence of language of a primitive Indo-European mother-tribe, from whose tongue have descended those of all the enlightened communities in Europe and of a part of those in Asia, at once challenged a search after relics of the faith that must have been held by that mother-tribe. And every one knows how well the search has been rewarded: how that the records of the old Vedic mythol-

ogy, chancing to exhibit something of the same exceptional primitiveness which belonged to Vedic language, were applied successfully to explain the mythologies of the pre-Christian periods of the other branches, Greek, Latin, Germanic, and the rest; nay, that even beneath an upper crust of Christianity have been found all over Europe in popular festivals and superstitions and legends—in short, in the whole department of folk-lore—abundant traces of the original Indo-European beliefs. This discovery laid, in fact, the practical foundation of the whole historical and comparative study of religions; since it was seen that what had been found true in this instance might, with due allowance for the difference of circumstances, be found true elsewhere. The idea of ethnic religions, and of their divarication by traditional growth, was clearly grasped, and the method of their historical investigation was established, and then faithfully extended and followed out. Another natural result was the linking of the comparative study of religions to that of languages, which had been and continues to be its most efficient aid; the striking analogies of material and mode of treatment between the two have been already referred to above.

An ethnic philosophy with its accompanying religion has its normal growth by gradual modifications and additions and losses, just like a language. Each successive phase of it contains nearly the whole of the next preceding phase, and more or less of yet earlier phases, in proportion to their distance. In spite of all the changes passed upon it, the traditional basis long continues traceable, altho, after a lapse of time greater or less according to the rate of alteration, it is capable of disappearing beyond recovery; even as the original structure and material of a language may be wholly hidden from sight by the disguising growths of a later time. Hence it follows that the first shapings of the hitherto indefinite views of a race, their first crystallizations into the form of doctrines, or myths, or individualized divinities, must have an influence out of proportion to their intrinsic importance upon the views of after-generations and the history of development of those views: even, again, as the first beginnings of structure in a developing language go far to determine the lines of later growth. But the growth of a religion is by no means wont to be informed throughout by the full intel-

ligence of those who hold it, and to change only in adaptation to the changes of their religious sense and of their comprehension of the world about them. On the contrary, it always tends to outgrow the understanding of its votaries, and to become a traditional system of names and forms, taken upon trust and believed in because hitherto believed in, its fundamental doctrines obscured, its practices only half comprehended, and their origin wholly forgotten. What in the history of language is analogous to this is the oblivion of the imitative and interjectional basis on which its first spoken signs rested, and its reduction to a purely conventional and traditional character; and then, further, the constant virtual repetition of this process in the neglect of the etymological meaning of individual words, and their transfer to offices which that meaning would never justify. But language is an instrumentality of which practical availability is the highest quality; and since this is only furthered by the complete conventionalizing of its constituent words and forms, the conversion is to be regarded as a normal and healthful one; while the traditionalizing and formalizing of a religion is of quite a contrary tendency. The *rationale* of the process is simple enough. As a rule, all over the world, a child grows up believing and worshipping as those about it, especially its parents, do; following the same religion with them, and the same sect of a religion, if there be such, down to its minutest subdivision, by the mere force of imitation and instruction. Then, when he grows older, and should have a judgment of his own to exercise in the matter, his habits and prejudices are already so formed as to render him incapable of a real judgment, and he goes on to the end as he had begun, accepting and in his turn propagating such doctrines and rites as he is used to, with a comprehension of them far less than would have been needed to compel his free and independent adhesion to them, making his religion a matter of faith with every degree of insufficiency of knowledge down to its total absence. A doctrine at its inception is strongly felt; it is the direct expression of the religious sense of its founders; but their actual vision becomes transmuted into the blindness of imitation on the part of their successors. A divinity is inferred from a certain class of effects in nature, and receives a name and is invested with

certain offices and attributes; then he becomes more and more an object of imitative worship and echoed description, and all that was at first characteristic of him is blurred into indistinctness. The history of rites is the same. The religious practices of a community come to be an established institution, having an independent propagative power of its own, its general purpose well enough understood, but all its details lacking the living force that once belonged to them. The stated performance of a fixed ceremonial, public or private, gets to be viewed as the highest religious act. It is by no means only in the department of religion that human institutions have the tendency thus to swing off their natural basis and acquire an independent value and sanctity: look, for example, at the way in which the sentiment of loyalty has exalted into something almost divine the simple administrative device that, for the greater stability of organized society, the eldest son of a chief ruler shall succeed to his parent's prerogatives. To hear some of the extollers of royal legitimacy, one might suppose the world created chiefly for the purpose of incorporating the great principle that a hereditary sovereign is master of the fates of his subjects.

Of the formalizing of religion by tradition there are certain special classes of results which call for brief notice.

In the first place (as already intimated above), the original significance of the names of gods, and their original spheres of action, are dimmed and forgotten. As regards the former, their fate is like that of proper names in general, which, beginning always with being significant, end in pure conventionality; and the individual office, tho the distinct recognition of it lasts for a time, is equally liable to fade out of knowledge. In the stage, for example, which the old Indo-European religion had reached in Greece, name and office of even the chief divinities have in general become so disguised as not to be traceable without the most careful investigation, and the help of comparison, especially with a less metamorphosed stage, like the Vedic; while even in the latter there are a plenty of doubtful problems. Sometimes the still discoverable etymology of a name furnishes a valuable intimation of the primary office, as when we find the words *dyu*, "heaven," and *dyu pitar*, "heaven-father," in *Zeus* and *Jupiter*, or interpret the Vedic *Varuna* as the "enveloping"

firmament; and it is in this way that language-study furnishes much of its aid to mythology. But, on the other hand, the office may be more distinct than the name, as in the case of the Greek ocean-god *Poseidon*, or the Hindu god of the thunder-storm, *Indra*, at the significance of whose titles only dubious guesses can be given. Characters and offices undergo redistribution, and a gradation of rank springs up which is foreign to the primitive character of a nature-religion.

Again, a mythology is liable to undergo a similar metamorphosis. A mythology forms a part of every nature-religion, and is more or less full and rich according to the liveliness of poetic fancy of its makers, and the distinctness of anthropomorphic personification with which they have invested the objects of their worship. A myth is by origin the statement of a natural phenomenon, cast in terms of a personal action: thus, Thor the thunderer hurls his hammer at the giants; it is stolen from him by the powers of winter, but recovered again after a season; his Indian counterpart Indra drives his noisy chariot across the sky, and transfixes the demon Vritra with his sharp weapon; the Dawn, a beautiful maiden, opens the gates of morning to the sun; Night spreads her sable mantle out over the world; and so on. In the beginning these statements have just as much distinctness and universal intelligibility as belongs to the beings to which they attach themselves; but they too share in the dimming and transforming to which these are subject. They are told over and over, passed from mouth to mouth, each time with some loss of comprehension of what they really signify, and with additions and alterations, always in the direction of a completer anthropomorphism; till they become mere stories, bits of biography of the divinities active in them—or of the heroes into which, by their aid and by the exaggeration of the anthropomorphic process, those divinities are converted. For, tho we need not deny that, in the growth of religions, mortals are sometimes raised to the rank of gods, we see clearly enough that the transfer is usually in the opposite direction; legend is in great part mere metamorphic myth, and legendary heroes are nature-gods humanized into the semblance of flesh-and-blood men: it is another way in which the boundary-line between the human and extra-human becomes effaced in the

naïve apprehensions of a primitive people. There is nothing more obscure in this than in the other parts of the formalizing transformation of religions under the careless keeping of tradition; but because tradition implies the instrumentality of language, it has seemed to certain scholars that they account for the whole process by defining mythology as "a disease of language:" a definition in which, if we are to take it as seriously meant, and not as a mere piece of mythologic pleasantry, we hardly know whether to wonder most at its utter misrepresentation of language, or at the ignoring of the real forces concerned which it implies.

Yet again, it is still more obvious that the forms and ceremonies of a religion tend to become stereotyped, to be practised by those to whom their original sense is unknown, and would if realized be unacceptable, and to have a growth of its own, as ceremonial, without reference to its underlying meaning. Thus, for example, the infinitely complicated Vedic ritual maintained itself throughout the whole series of revolutions of religious history in India, and is even yet practised by the Brahmanic priesthood, tho its significance has long since completely died out. Or—since there is almost nothing in heathen religions which has not its analogue in the aberrations of one or another form of Christianity—we may take as an example of a different kind the growth and propagation of the Romish ceremonial, involving the metamorphosis of the simple commemorative Lord's supper into a miraculous sacrifice, patterned after the sacrifices of the religions which Christianity displaced.

Once more, it may be fairly claimed that idolatry, wherever found, is a product of the degradation of a religion. There seems no good reason to believe that the actual worship of individual objects, whether images or anything else, is an original feature in any religious system, lower or higher. At the outset, the use of such objects was only an aid to devotion, or help to the worshipper in his effort to concentrate his thought upon what is invisible and ineffable; or else, by some means or other, the particular object has acquired a special portion of the universal energy, something of the sanctity which is capable of being attributed also to particular times and particular places.

The most enlightened worshippers continue fully aware of the merely representative character of the object: only, of course, the ignorant multitude as good as deify the symbol, and that in the highest religion as well as in the lowest. It is but a descending series from the holy water and relics and miraculous images of Catholicism, down through the effigies and holy places of the nations in general, and the almost universal use of amulets, to the rude stone or clod of the fetish-worshipper. Fetishism is the lowest form of idol-worship, yet essentially akin with all the rest, and, like the rest, a blundering and degraded version of something better that preceded or accompanies it. And the very spirit of fetishism is seen in the insistence on the details of ceremony, and the worship of utensils and postures and dresses, which are not unknown even within the limits of Protestant Christianity.

It is to be added that a most important item in the history of development of a religion, giving enhanced efficiency to all its bad tendencies, is the uprisal of a priestly caste or guild, regarded as supernaturally endowed with peculiar wisdom and sanctity, which takes into its special keeping the doctrines as well as the practices of the national faith, and authoritatively expounds the one and performs the other. Not only does this widen the distinction that must always exist between the instructed and the uninstructed worshippers, but it introduces an element of selfish interest that tends to spread corruption everywhere. We have no room to dwell upon the priestly factor in religious history, but it plainly does much to complicate the already intricate combination of causes that enter into and determine the course of that history.

Under all these influences, it may fairly be claimed that the normal tendency of a religion, when once formulated and established, is toward decay: it is not maintained at its original height, but sinks on the one hand into priestly formalism, and on the other into popular superstition. To a gradual and penetrating reform, which should keep it up to the level of the best and truest thought in the community that professes it, it offers in general a successful resistance. The case cannot in the nature of things be otherwise. A religion is, as we have seen, the out-

growth in a certain direction of a philosophy. It is founded on and includes in its own structure a certain solution of the problem of the universe, investing that solution with all the inviolable sanctity which it is able to bestow. Its attitude is not that of one offering the best light that is thus far to be had, and craving more; it is that of one who knows absolutely, and can speak with supernatural authority. It says, the gods are so and so, and their government of men is after this fashion, and they are to be thus propitiated and worshipped; and he who says otherwise is an impious blasphemer. And this, partly with all the fervor of sincere faith, partly with the obstinacy of unreasoning conservatism, and partly with the selfish fury of a guild that sees its craft endangered. No religion that does not itself contain and teach the absolute truth can look without fear on those who, unsubmissive to its authority, are searching after more and truer truth. This is the ground of the so-called antithesis between science and religion. Even the Greek faith, hollow and weak as it was, and nearing its downfall, had vigor enough left to persecute the philosophers, and put the best of them to death. The sometimes-vaunted toleration of Mohammedanism lasted for but a moment of perplexed ignorance, until the faithful realized what was the nature and tendency of the scientific movement; when they stamped it out so thoroughly that nothing more was ever seen of it. Even Christianity, three centuries and a half ago, had to pass through a revolution, with fire and sword and endless devastation and misery, in order to make partially successful what needed not to be the substitution of a new faith, but only the return to something nearer its own original standard, to rid itself of the usual dual product of degradation, priestly formalism and hypocrisy and popular ignorance and superstition, and to shake off the Inquisitorial hands that forced a hollow and fruitless recantation from the lips of Galileo, and even now would gladly strangle modern knowledge and education, as subversive of its sway over the minds of men.

Thus the old race-religions could not but become effete, incapable of satisfying the more enlightened religious cravings of the communities that had produced them. But, incapable also of reformation from within, of revivifying themselves by

absorbing and representing the thought of the best and wisest of their devotees, they have had to submit to complete overthrow, and the substitution of faiths of a different origin. There is no more marked distinction among religions than the one we are called upon to make between a race-religion, which, like a language, is the collective product of the wisdom of a community, the unconscious growth of generations, and a religion proceeding from an individual founder, who, as leading representative of the better insight and feeling of his time (for otherwise he would meet with no success), makes head against formality and superstition, and recalls his fellow-men to sincere and intelligent faith in a new body of doctrines, of specially moral aspect, to which he himself gives shape and coherence. Of this origin are Zoroastrianism, Mohammedanism, Buddhism; and, from the point of view of the general historian of religions, whatever difference of character and authority he may recognize in its founder, Christianity belongs in the same class with them, as being an individual and universal religion, growing out of one that was limited to a race. For faiths thus originated have a very different propagative force from their predecessors: the latter were content with the allegiance of the race that produced them, tolerant if not interfered with on their own ground, ready to admit the claims of other faiths like themselves, and even to borrow from them; the former claim an undivided authority and unlimited acceptance; they go proselyting, by persuasion or by force, in every direction; they are strict to impose uniformity within and break down opposition without; and they have long since brought within their pale all the leading nations of the world.

We have thus made a hasty review of the outlines of what the historical and comparative study of the world's religions, ancient and modern, believes itself to have established, and so solidly that it is likely in the main to stand, whatever modification in minor respects, and whatever filling-in of particulars, it may receive from the results of future investigations. That it will ever attain in detail the definiteness of the kindred science of language is hardly to be expected; it is a history of men's opinions, as inferred from modes of expression far less clear,

objective, and trustworthy than are the records of speech. But, whether it attain or not the *status* of a science, it is at any rate a branch of the study of man and his institutions having such importance that no one can afford to be ignorant of its methods or to disregard its results.

WILLIAM D. WHITNEY.

